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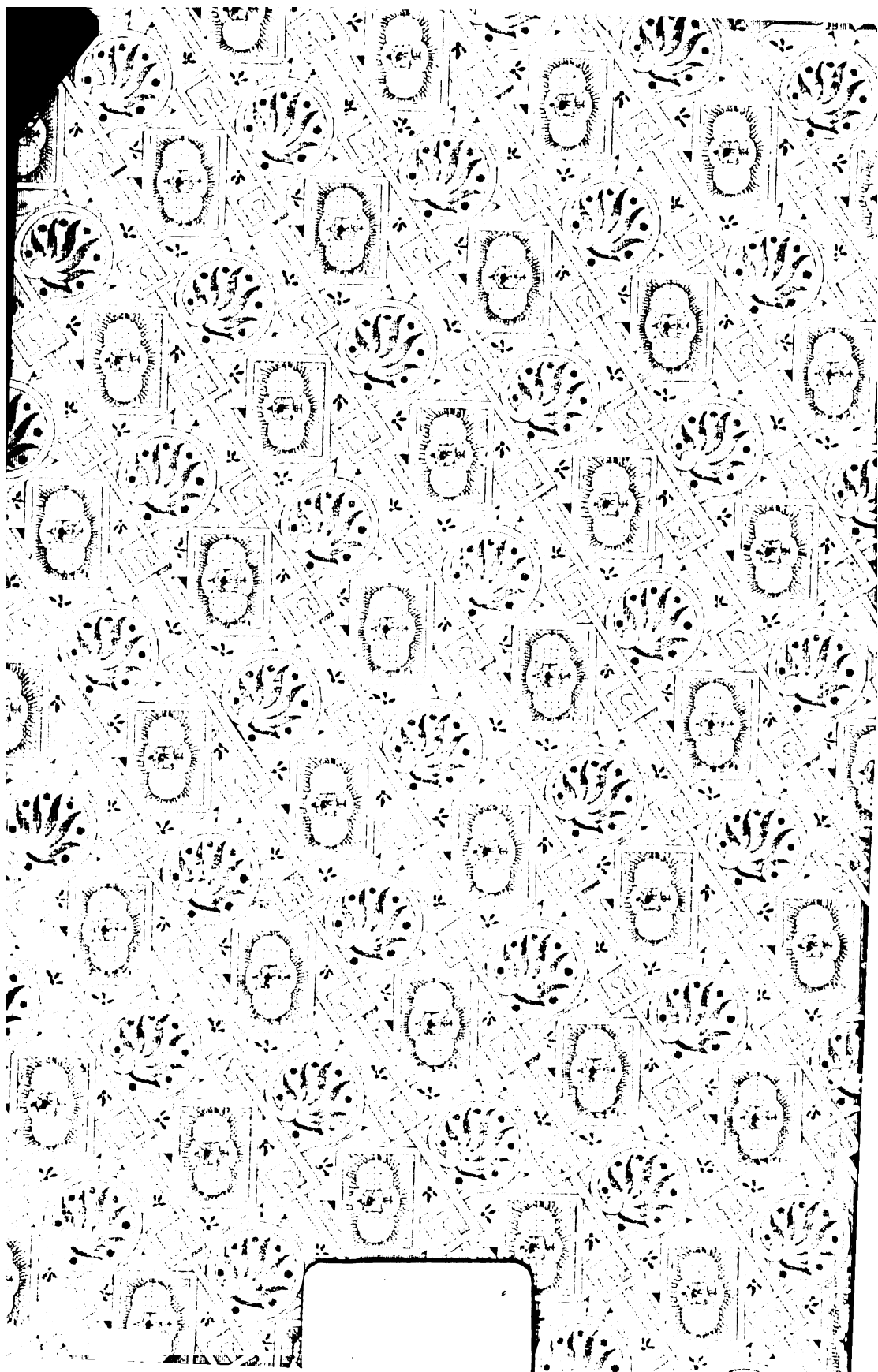
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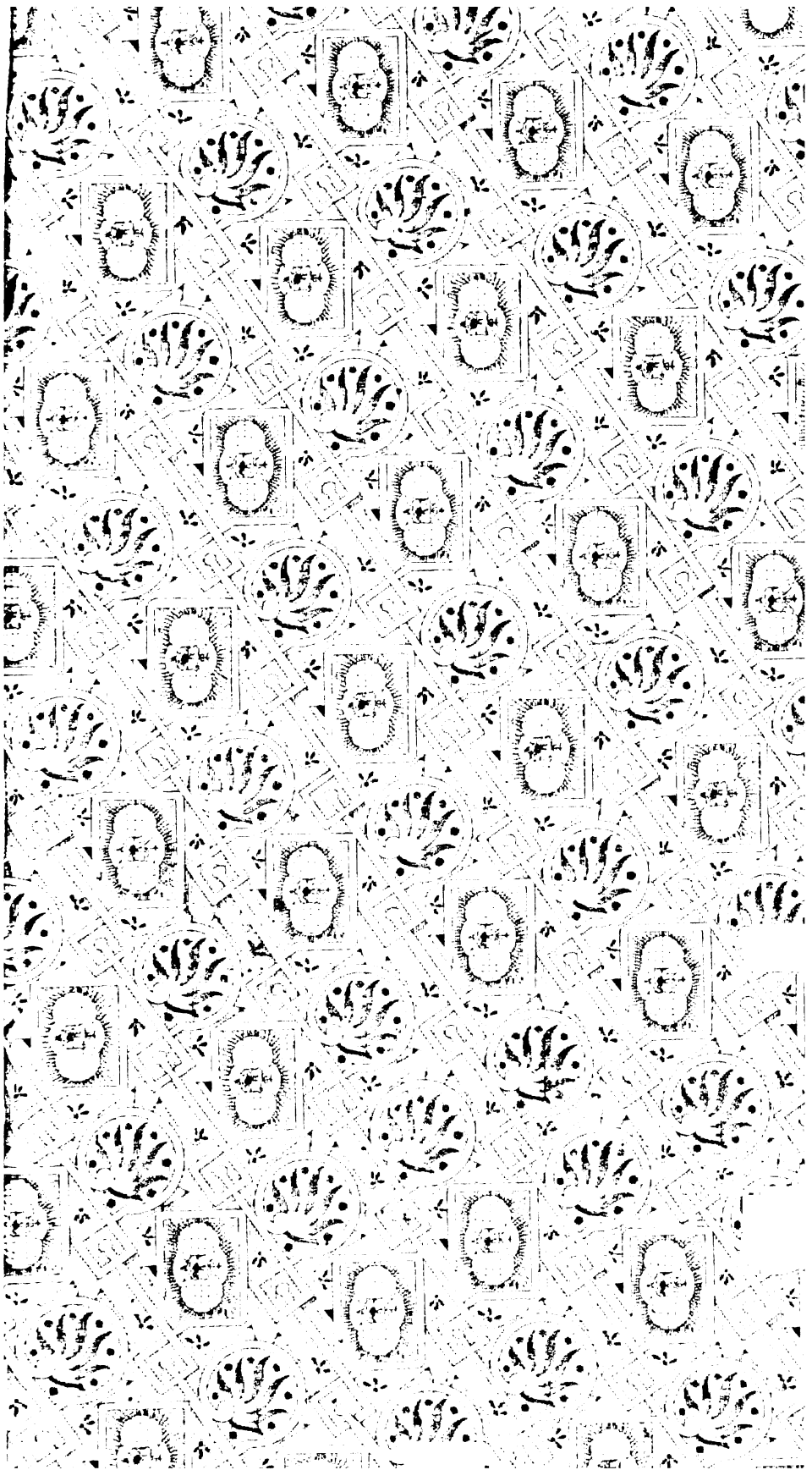
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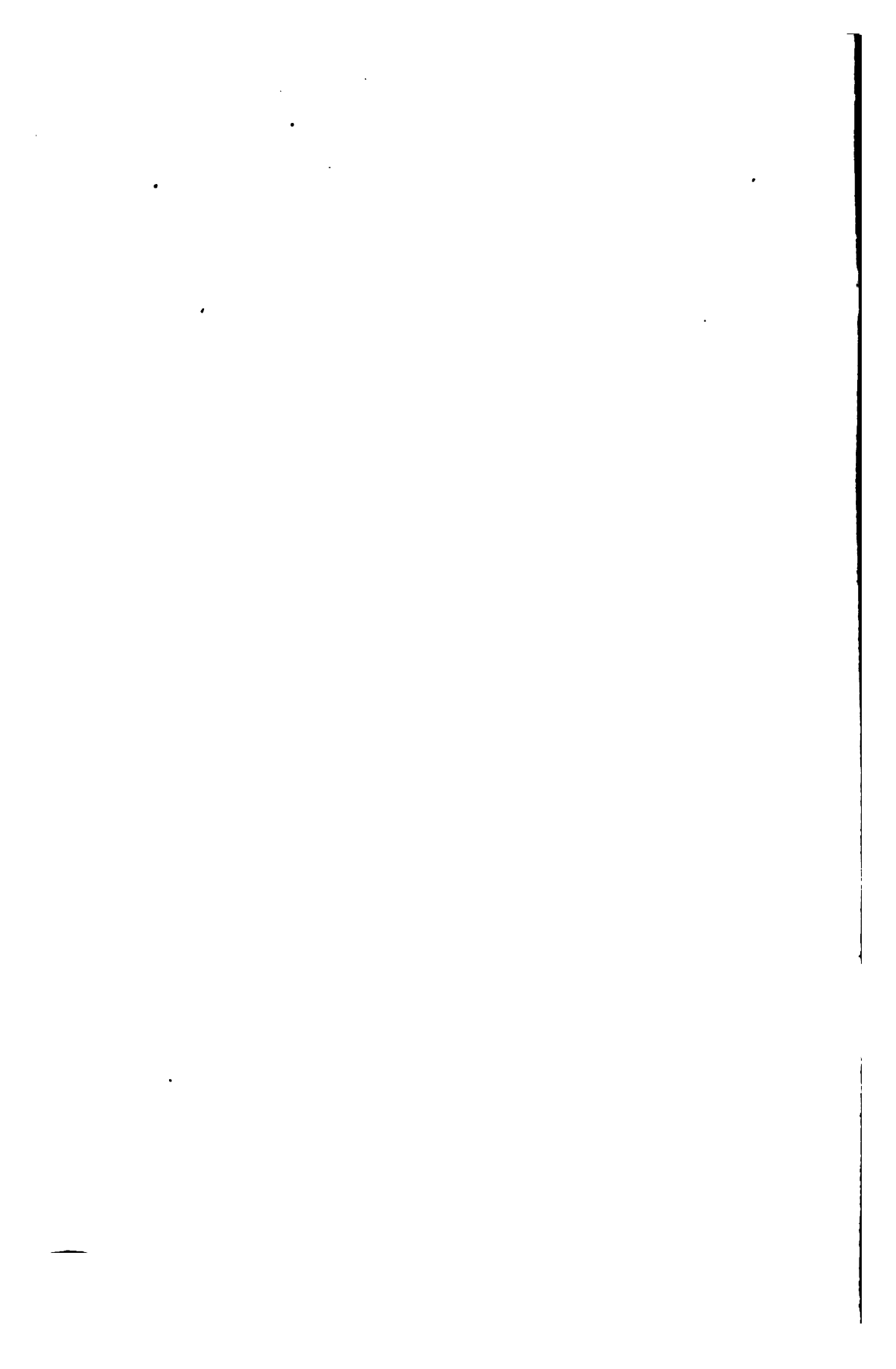
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ANNUAL
OF THE
UNIVERSAL MEDICAL SCIENCES

A YEARLY REPORT OF THE PROGRESS OF THE GENERAL
SANITARY SCIENCES THROUGHOUT THE WORLD.

EDITED BY

CHARLES E. SAJOUS, M. D.,

AND

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ASSISTED BY

OVER TWO HUNDRED CORRESPONDING EDITORS, COLLABORATORS,
AND CORRESPONDENTS.

Illustrated with Chromo-Lithographs, Engravings and Maps

VOLUME I.



1893.

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PREFACE.

IN presenting the sixth issue of the *ANNUAL* to the medical profession, the editor must again acknowledge his gratitude to the members of the editorial staff who, by their promptness and kindly interest, have facilitated the work of the central department. The temporary removal of the latter to Paris tended greatly to complicate matters, while the introduction into the associate staff of a number of foreign authors added at least one month's work in translation, revision, etc., to the usual quantum. To the promptness of the majority of the associates was added the usual willingness of the editor's immediate assistants to do all in their power to diminish the arduousness of his yearly task; and these elements, supplemented by the efforts of the publishers to execute as rapidly as practicable the mechanical portion of the work, made it possible to issue it at the usual time.

The preface of the fifth issue stated that "a prolonged sojourn in Europe, contemplated by the editor, will, it is hoped, open many new channels calculated to widen the scope of the work, and increase the sphere of its usefulness." A year minus five days has already elapsed since those lines were written. Much has been done in the direction mentioned, the system of distribution of material among the members of the staff has been greatly modified and improved, and it is sincerely hoped that with their obliging co-operation in the measures adopted (which, indeed, are calculated to facilitate their labor) the date of appearance of the work will be materially advanced. The presence in the active list of twelve such eminent European names as Dujardin-Beau-

metz, Benjamin Ward Richardson, Lépine, Obersteiner, Bourneville, Kerr, Lutaud, Budin, Buxton, Levison, Apostoli, and Poirier, each at the head of a department representing his own particular sphere, affords an example of the position enjoyed by the work in Europe. The countries represented by these authors include those in which, outside of its native land, it has found the greatest appreciation. Though remaining American in every sense of the word, the truly international character of the ANNUAL, scientifically speaking, is thus asserted; and if it does intend, as an American work, to claim increased recognition abroad, it first affords a proof of its own generosity. Indeed, the western continent has developed at a speed unparalleled in the history of all times; utilizing the best of every land, its integral elements are untrammelled in their progress by routine, and unrestrained in their scope by self-sufficiency. Medicine has had its share in this general advance; and were America's many contributions to the welfare of suffering humanity removed from modern methods, a gap of surprising dimensions would appear. Perhaps in a better position than any one to judge, the editor could with regret, however, point to the large proportion of really valuable articles published in the United States remaining unseen on the continent of Europe. It were vain to deny their sufficient worth; many neglected works are, indeed, far above the average of general medical literature. As regards bibliographical research, none can show more valuable labor; unembarrassed by insular prejudices, assisted by that most valuable publication, the *Index Medicus*, no class of authors seeks more to do justice to all nations than that represented by the American medical profession.

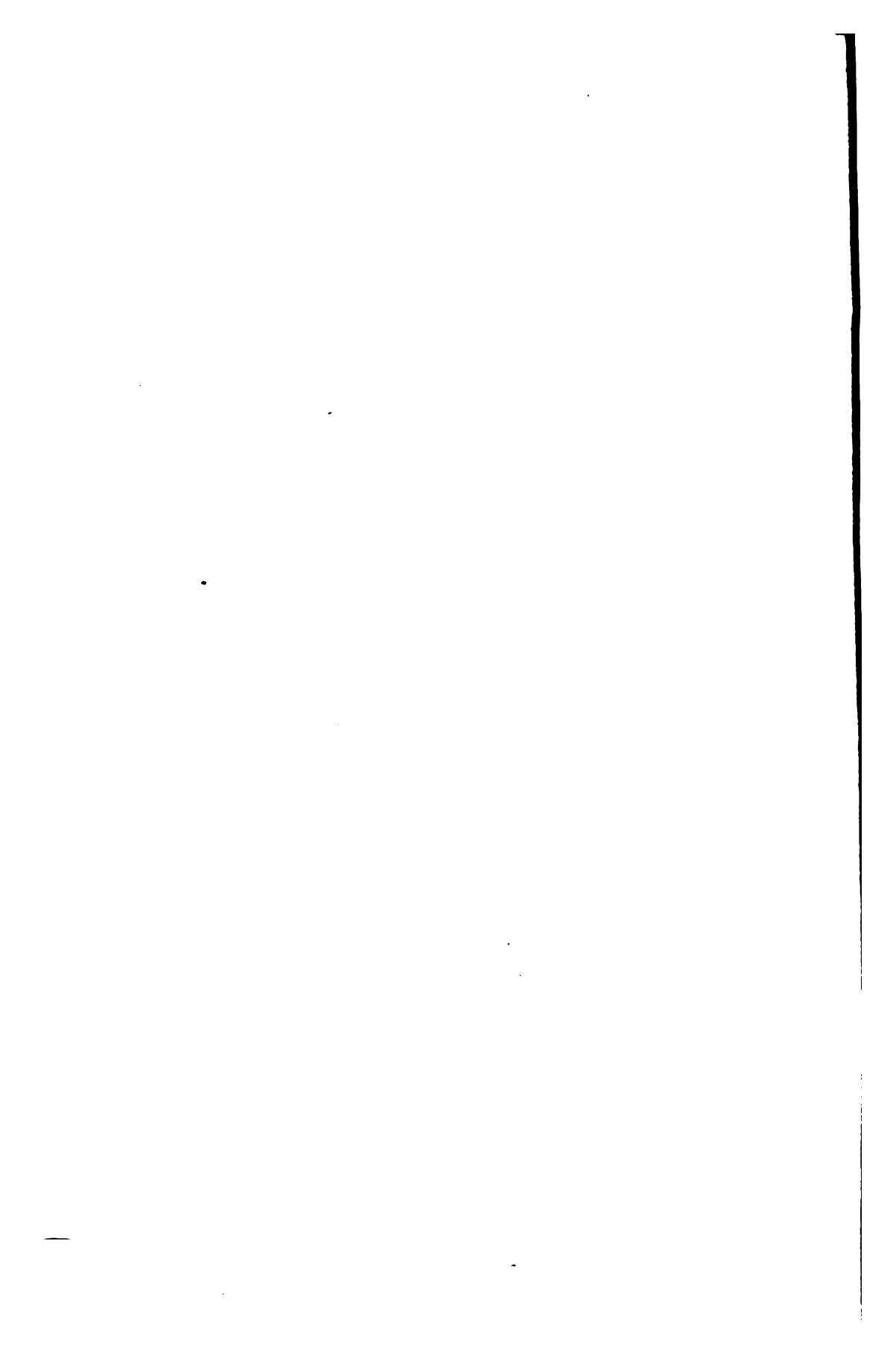
Two members of the associate staff were removed by the hand of death during the year, both in the prime of life,—Dr. William R. Birdsall, of New York, and Dr. Franklin H. Hooper, of Boston. Dr. Birdsall's affability and sincerity had earned for

him much warm feeling, and his demise was a severe blow to his many friends. In Dr. Hooper the American profession lost a laryngologist of marked scientific attainment and clinical acumen, and those who knew him personally one of the best and truest of friends. Ever mindful of the feelings of others, even during the excitement of heated debate, he had acquired an enviable reputation as the possessor of every quality that constituted the true gentleman. As a friend said of him, "Hooper lived and died a noble fellow."

Before closing, the editor wishes to express his thanks to his friend, Dr. C. Sumner Witherstine, of Philadelphia, who kindly undertook to give the proofs the final reading, and thus insure their entire accuracy. The publishers, The F. A. Davis Company; Mr. M. I. Brock, the editorial department's special correspondent in the publishers' offices; and Mr. H. B. Van Horn, manager of the typographical department, are also entitled to the gratitude of the editor for many acts of kindness. Messrs. Burk and McFetridge, lithographers, have, as usual, done their utmost to make their part of the work—the colored plates—as perfect as possible.

THE EDITOR.

28, RUE DE MADRID, PARIS, FRANCE,
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By CHARLES S. DOLLEY, M.D.,

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Professor of Biology in the University of Pennsylvania.

DISEASES OF THE KIDNEYS, BLADDER, AND ADRENALS.

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DISEASES OF THE LUNGS AND PLEURA.

By JAMES T. WHITTAKER, M.D.

ASSISTED BY

E. S. MCKEE, M.D., AND S. P. KRAMER, M.D.,

CINCINNATI.

TUBERCULOSIS.

Etiology.—Schuchardt⁴¹_{July}, calls attention to two cases of a mixed infection of the initial lesion of syphilis and local tuberculosis. In the one case he found a chancre on the penis and a tuberculous enlargement of the testicle. He was able to demonstrate the presence of tubercle bacilli in the chancre. In the second case he found, in the vagina of a young girl, the mistress of a tubercular man, a number of soft sores, and, in addition, a tuberculosis of the inguinal and pelvic lymphatic glands. Tubercle bacilli were found in the ulcers. The author also reports a case followed by tuberculosis of the epididymis of both sides, with subsequent formation of fistulæ. The examination of the pus revealed the presence of tubercle bacilli. The affection healed spontaneously. [Was it really tubercular?] On examining the pus from six cases of gonorrhœa, tubercle bacilli were found in two. In one of the six cases an injection of tuberculin produced a febrile reaction. In the other cases tubercular affections had been present for some time. The author maintains, as the result of these examinations, that a new form of tubercular infection is to be recognized,—that of a tuberculous surface catarrh, unaccompanied by the formation of ulcers or other tissue changes, which may disappear spontaneously, and even in the later stages remains confined to the epithelium. He gives it the name gonorrhœal tubercular catarrh.

Solles¹⁸⁸_{No. 5} reports the results of experimental inoculation of two guinea-pigs, one with the fluid expressed from the testicle of a tuberculous subject, the other with the spermatic fluid obtained from the seminal vesicle of another tuberculous subject. In the

first, the induration at the site of inoculation slowly disappeared, without involvement of adjacent glands, and the animal recovered. In the case of the second guinea-pig, fatal general tuberculosis developed. The evidence, in so far as is furnished by this single case, points to the hereditary transmissibility of tuberculosis.

A. Jaruntowski, ⁷⁸³₁₉₁₁ collecting from literature (Lebert, Brehmer, Mendelsohn, Grawitz) numerous cases and opinions as to the traumatic causation of the disease, adds the following case of his own: A man of 30 years, without any hereditary predisposition, received a strong blow on the upper part of his chest, after which hæmorrhage and fainting ensued. Four and a half months after improvement took place, and eight months after the accident a repetition of the hæmorrhage occurred. Being examined four months later, undoubted signs of phthisis were detected (tubercle bacilli, etc.). Whether trauma causes changes in the lungs which occasion favorable conditions for the development of tubercle bacilli (Mendelsohn), or whether we have to do here (Reuhle) with latent tuberculosis, which under the influence of trauma passes into the manifest, is not positively decided. At any rate, the influence of trauma in the etiology of phthisis, in this case as well as in others, is very distinctly marked.

Tuberculosis in Lower Animals.—The relation between human and avian tuberculosis still continues to be a subject of discussion. Maffucci, ⁵⁸_{1911, p. 446} after a historical review of the subject, reports the results of his own experiments, according to which the bacillus of tuberculosis in birds differs from that found in man in the following particulars: When inoculated upon guinea-pigs, the former does not produce tuberculosis, and seldom produces general tuberculosis in rabbits. The cultures of the bacillus of avian tuberculosis upon the various media have a different appearance from those of human tuberculosis. The temperature at which they grow varies between 35° and 45° C. (95° and 113° F.); 70° C. (158° F.) destroys them. The bacillus of avian tuberculosis retains its vegetative and pathogenic properties for two years. The avian bacillus, when sterilized, produces a substance poisonous to guinea-pigs, but of little toxicity to the grown hen. The tubercle produced by this germ in the gallinacæ contains no giant-cells. The bacillus of mammalian tuberculosis has the following characteristics as opposed to the above: It produces tuber-

culosis in guinea-pigs and rabbits, but not in birds. Its cultures have a different appearance. The bacilli grow between 30° and 40° C. (86° and 104° F.), and can withstand a temperature of 65° C. (149° F.) for one hour. Kept at a temperature of 45° C. (113° F.), cultures cease to grow after a few days. Cultures of one year's growth are with difficulty transplanted, either upon new culture soil or upon animal tissue. The sterilized bacillus forms a substance poisonous to the guinea-pig, and, at times, also toxic to the grown hen. The tubercles found in mammalian tuberculosis, as a rule, contain giant-cells. Whether these two bacilli are different species of the same genus, or whether they are totally different varieties, is not as yet clear.

Cultures, Toxins, Immunity, etc.—Pastor⁵⁰_{2,40,p.222} has reported a method of obtaining pure cultures of the tubercle bacillus from the sputum. Sputum known to contain tubercle bacilli is obtained in a sterilized test-tube, after the patient has repeatedly rinsed his mouth and throat with sterilized water, and then filtered through fine gauze. A few drops of the filtrate are added to a tube of fluidified 10-per-cent. gelatin in such quantity that a drop of the mixture shall contain a few tubercle bacilli on microscopic examination. A plate is then poured from the gelatin-tube. In a few days the colonies of those bacteria other than the tubercle bacilli have developed, and the chances are that the bacilli tuberculosis are contained in the clear spaces between them. Clear parts of the gelatin are then carefully removed with the sterilized knife and transferred to glycerin-agar or blood-serum. Of ten tubes thus prepared, one or more pure cultures of the tubercle bacilli may be obtained. Kitasato⁵⁸_{p.44} has published an ingenious method devised by Koch for obtaining pure cultures of the tubercle bacillus from the sputum. The early morning sputum, especially that which is brought up by coughing and not by hawking, is obtained directly from the patient in sterilized Petri double-dishes. A floccule which has come from the deeper portions of the respiratory tract is isolated with sterilized instruments, and then immediately washed in at least ten successive dishes filled with sterilized water. This is divided under water, and a portion used for the preparation of a microscopic slide to determine whether any tubercle bacilli be present. Very frequently this is the case. Another portion from the centre of the mass is then carefully transferred to a glycerin-agar or

blood-serum tube. Cultures obtained from sputum in this way differ somewhat from those obtained from tuberculous organs. Instead of the young cultures being dry, dull, and wrinkled, as those obtained from tubercular patients, they are made up of round, white, opaque spots raised above the surface of the agar, and are moist, bright, and not wrinkled in appearance. In cultures obtained from cavities, Kitasato found, besides the tubercle bacillus, three different forms of bacilli, two forms of streptococci, and two micrococci. Many of the tubercle bacilli obtained from the cavities had died and yet retained their tinctorial characteristics.

Bonardi⁴⁰⁰_{p.400,71} investigated the alkaloids obtained from the sputum and organs of phthisical patients. He found a substance analogous to the leucomaines; and extracted another substance, soluble in glycerin, whose nature he was unable to determine. Both these substances produced a marked reaction when injected in certain animals, viz., frogs and guinea-pigs. In the rabbit, the effect was less; in the dog, the injections had an aphrodisiac effect. The alkaloids extracted from the sputum were more toxic than those obtained from the viscera. In the guinea-pig, the injection of either of the two substances produced a slow and progressive intoxication and true marasmus, with grave changes in the viscera, liver, spleen, intestine, and, above all, in the blood. Experiments with the view of producing immunity with these products failed.

Prudden and Hodenpyl⁵⁰_{no.61} studied the influence of dead tubercle bacilli introduced into the living animal. As shown by Buchner, the proteids derived from the bodies of various organisms (bacteria proteids) have a distinct, probably chemical, influence upon the cells of the body. Certain of these proteids seem to attract the cells (positive chemotaxis), others to repel them (negative chemotaxis.)

In their experiments the authors used large amounts of pure cultures of the tubercle bacillus prepared in the following manner: After exposure to a temperature of 100° C. (212° F.) for four hours, the cultures were freed from culture medium, foreign matter, etc., by washing and filtering. They were then injected either subcutaneously into the abdominal cavity, thoracic cavity, into the blood-vessels, or into the lungs through the trachea. The leucocytes were attracted to any point where the particles of culture

were situated. The cells of the parts containing the dead tubercle bacillus began to proliferate. The smaller the amount of culture material in a given place, the smaller was the lesion observed. Caseous degeneration was never seen; at times, however, a beginning necrosis of the leucocytes was observed. The new tissue went on to the formation of fibrous tissue, with subsequent contraction. At times there were formed epithelioid nodules, which remained for from two to three months. The process is, in all probability, brought about by the bacteria proteids of the tubercle bacilli. Thus, in the blood-vessels, a proliferation of the endothelium; in the connective tissue, of the connective-tissue corpuscles, etc., was observed. In the lungs a proliferation of both the epithelial and connective-tissue elements was observed, and in 90 per cent. of the cases giant-cells were produced. The bacilli, which are at first well formed, gradually disintegrate and disappear. With their disappearance comes the end of the active process. These experiments were substantiated by Abel in every particular. ⁶⁹
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Strauss and Gamaleia, ⁴⁵⁷_{p. 174, 71} have published a very thorough research along the same lines. They found that dead tubercle bacilli, when injected, preserved their peculiar morphological and tinctorial characteristics many months after their injection,—a property possessed by no other organism except that of lepra and the bacillus of avian tuberculosis. In their experiments the authors used pure cultures which had been thoroughly dried and then heated to 115° C. (239° F.) for ten minutes. With this matter emulsions were made for injection of different strengths,—0.01, 0.001, and 0.0001 gramme ($\frac{1}{1000}$, $\frac{1}{10000}$, and $\frac{1}{100000}$ grain) to 1 cubic centimetre (16 minims) of water. These emulsions were injected into rabbits, guinea-pigs, and dogs (intra-peritoneally and intravenously), in doses varying from $\frac{1}{2}$ to several cubic centimetres of the strongest emulsions. In a few days the animals thus injected began to emaciate and die. In others death occurred in from five to ten days, after a loss of half the body-weight. The lungs of such animals were invariably filled with small nodules exactly like tubercles. The nodules consisted of epithelioid cells, a number of bacilli easily demonstrated by staining, but no giant-cells. With a dosage of $\frac{1}{10}$ of the preceding, the animals showed rapid emaciation, but gradually recovered their former health. A rep-

etition of the same dose, however, produced death within twenty-four hours. Probably the previous intoxication had so weakened the powers of resistance that they were unable to withstand the renewed intoxication. A dosage of $\frac{1}{20}$ of the first or lethal dose produced no apparent changes. A gradual increase of amount produced an immunity to the dosage, which would have proved fatal if given originally. Where the injection was given intraperitoneally, the same picture was observed, the emaciation being, however, more gradual. Within the abdominal cavity were found numerous nodules, at times the size of a hazel-nut, made up of a thick, purulent matter surrounded by a vascular fibrous membrane. The peritoneum was covered with miliary nodules. Subcutaneous injection produced a localized abscess. [This fact was first noted by Koch in his experiments, and led up to the discovery of tuberculin.—ED.] The dead bacilli retain their toxic properties when exposed to a temperature of 120° to 130° C. (248° to 266° F.) for ten days, when extracted with alcohol or ether, or when stained with carbol-fuchsin. Such injections were very nearly as virulent as the above.

From all these researches, we may conclude that the proteid which makes up the body of the bacilli is the peculiar toxin which produces the lesion of tuberculosis. What part of the toxic symptoms (fever, anæmia, etc.) are produced by this product, and what part is caused by the products of the vital metabolism of the germ (ptomaines, toxalbumens, etc.), must remain a matter for further investigation. Any procedure which shall cure tuberculosis must both counteract the toxic effect and bring about an elimination of the bacilli from the body.

Tchistowitsch ⁴_{nos. 20, 21, 22} reports a case of tuberculosis in which a cavity of the left apex had, by the production of an adhesive pleuritis and subsequent suppuration, communicated with the outer air by means of fistulæ in the second and third intercostal spaces. The author took advantage of this excellent opportunity to examine the micro-organisms of the cavity, especially since he could obtain some of its contents without previous contamination by passing through the air-passages, throat, and mouth. Besides a large number of tubercle bacilli, the author found the staphylococcus pyogenes aureus, and three other varieties, to which he gave the following names: (1) coccus albus, non-liquefaciens; (2) bacil-

lus agilis; and (3) bacillus fungoideus. The injection of the first two in rabbits had no effect. The injection of the last by itself was but slightly virulent. In combination, however, with the other two, it proved very virulent. The bacillus fungoideus rapidly multiplied in the blood, the animal dying from general sepsis.

Pathological Anatomy.—As is well known, the Virchow school of pathology have always maintained that phthisis pulmonalis and tuberculosis pulmonalis are not identical processes. Langerhaus ⁴_{no. 2, vi} reports two cases, by whose history he seeks to substantiate this view. In the first case the patient had suffered from a chronic pleuro-pneumonia fibrinosa. Tubercle bacilli had been found in the sputum during life, but the post-mortem examination showed absolutely nothing which could be ascribed to the action of the bacilli. In the second, a case of sarcoma which had compressed the bronchial tubes, typical tuberculous lesions were found; but a careful examination failed to demonstrate the presence of the bacilli. [This does not prove anything, since we have no assurance that the bacilli were not present, even though the author did not find them.—Ed.] According to the author, the chief interest attached to the last case was the fact that the pneumonic exudate went on to caseation, and that the parenchyma became necrotic in the same way as is found in the caseous hepatization produced by the tubercle bacilli.

Troje ⁶⁹_{no. 3} found, in the pleura of a tuberculous subject, characteristic structures very similar to the nodules found in the lower animals suffering from “perl-sucht.” From his experiments, in which he inoculated animals with tubercle bacilli which had been treated with iodoform, the author concludes that the disease known as “perl-sucht” is caused by attenuated tubercle bacilli.

Imbert ¹⁰⁰_{no. 22} reports a peculiar case of tracheocele occurring in a phthisical patient, aged 51 years, who had suffered for years from severe cough. The tracheocele occurred on both sides and was about the size of an apple. The author discusses the causation of this complication, the result, as a rule, of ulcerative process in the air-passages.

Heymann ⁴_{no. 15} reports a case of tuberculosis in which one of the earliest symptoms consisted of a bronchial paralysis of the dilators of the glottis. The author concludes that the phenomenon is very

probably brought about by the pressure of tuberculous lymph-glands on the recurrent laryngeal nerve.

Borschke²⁰ has published an exhaustive research on the pathogenesis of tubercular peritonitis. The post-mortem examination of 1393 phthisical subjects made in Breslau, from 1878 to 1884, revealed the presence of tuberculosis of the peritoneum in 226 cases. In 16 of these cases there was found a miliary tuberculosis; in 2 cases an isolated peritoneal tuberculosis, without the presence of tuberculosis in any other part of the body. Six cases showed tuberculous disease, either of the pericardium or of the pleura, accompanying that of the peritoneum. In 2 cases peritoneal tuberculosis was found, accompanied by isolated tuberculosis of the mesenteric, portal, and bronchial lymphatics. No case of isolated intestinal tuberculosis was found.

H. P. Loomis⁵⁹ gives the results obtained from the study of the records of 1146 post-mortem examinations made at the dead-house of Bellevue Hospital. 1. Out of 763 persons dying of a non-tubercular disease 71, or over 9 per cent., at some time in their life had had phthisis, from which they had recovered. 2. The new fibrous tissue, by which the advance of the disease was apparently checked and the cure effected, developed principally by round-cell infiltration of the interlobular connective-tissue, which, in some instances, had increased to an enormous extent. Some of the new fibrous tissue was formed later by round-cell infiltration in the alveolar walls and around the blood-vessels and bronchi. Pleuritic fibrosis appears to be secondary to tubercular processes in the lung-substance. The interlobular connective tissue is the primary and principal source of the fibrosis. 3. Tubercle bacilli were present in the healed areas in three out of twelve of the lungs examined. These healed areas did not differ in their gross or microscopical appearances from those in which they were not found. 4. Thirty-six per cent. of all cases where the lungs were free from disease showed localized or general adhesions of the two surfaces of the pleura.

Forms and Varieties.—Sir Andrew Clark^{v.2, No.1} differentiates two forms of phthisis, the one a non-bacillary disease, the other the true tuberculosis. Although the vast majority of cases of phthisis are caused by the bacillus, yet he finds that a considerable minority of the cases, in which the bacillus is not found throughout the dis-

ease, give the physical signs which are regarded as typical of phthisis, namely, the sounds of an infiltration process, bronchial breathing, dullness, and moist râles. To these cases the author applies the name of fibroid phthisis. The general health of patients suffering from this affection, as a rule, remains good in all stages of the disease. They are free from fever, and generally live to an advanced age.

The real explanation is, however, according to the modern conception, that these cases are examples of tuberculous disease which have taken on fibroid change, the process which constitutes spontaneous healing. In these cases dead bacilli dwindle and disappear.

Maragliano⁴_{No.15} differentiates cases of tuberculosis from cases of phthisis in the following way: In the ordinary form of pulmonary tuberculosis the process is one of a pure tubercular infection. In the disease which he characterizes as pulmonary phthisis we have a secondary infection, that of pus-formers, or staphylococci and streptococci.

Le Noir¹⁰⁰_{No.40} considers the frequent *albuminuria* occurring in phthisical patients as follows: The albuminuria may depend upon a disease of the kidneys, upon derangements of the physical process concerned in the secretion of urine, or upon changes in the blood. Thus we may have (1) the ordinary fever albuminuria,—occurring, however, rarely; (2) the albuminuria attending dyspnoea, of rare, if not doubtful, occurrence; (3) a dyspeptic albuminuria, occurring frequently in patients suffering from dilatation of the stomach, in which case the albuminuria results from the excretion by the kidneys of absorbed albumens which have been insufficiently digested; (4) the intestinal albuminuria (globulinuria), as a result of severe diarrhoeas; (5) the albuminuria resulting from enlargement of the liver; (6) albuminuria resulting from general disturbances of nutrition without any especial organ being affected; (7) the toxic albuminuria, as a result of the absorption of toxins from the intestinal tract, the lungs, or otherwise.

Tuberculosis in Children.—N. F. Engelnäh⁵⁸⁸_{No.10; Sept.10}² has made a bacteriological examination of the lungs, and the bronchial and mesenteric glands, in 120 infants who died in the St. Petersburg Vostatelny's Dom from October 3 to November 15, 1891. The ages varied from 5 days to 8 months and 3 days. Of this number, in 14

(11.7 per cent.) tubercle bacilli were found, the age of the infants varying from 2 months and 4 days to 7 months and 7 days. In the lungs, the bacteria were detected in 93 per cent. of the tuberculous cases; in the bronchial glands, similarly in 93; and in the abdominal glands, in 86. Pulmonary tuberculosis alone was present in 7 per cent., abdominal alone in 7, and both simultaneously in 93. An analysis of the records of the same institution for the last decennium has shown that the average annual frequency of tuberculosis is about 2.62 per cent. of all post-mortem examinations. The percentage in different years varies between 0.82 and 5.18, while the monthly frequency oscillates between 0 and 12.94 per cent. The disease occurs most frequently in infants of 2 or 3 months.

Aviragnet,¹¹⁸ in an exhaustive research on the various clinical forms of tuberculosis as they occur in children, comes to the following conclusions:—

1. That the most frequent form of tuberculosis in children is that of general tuberculosis. A localized tubercular affection may be regarded as exceptional.

2. The general tuberculosis may be acute, subacute, or chronic. The acute form manifests itself in three different varieties: (*a*) as an intense tuberculous infection; (*b*) a continuous tuberculous fever (typho-tuberculosis); (*c*) general acute miliary tuberculosis. The subacute form is known as "galloping consumption." The chronic form of the disease is that form which is found more especially in very young children.

3. The localized tuberculosis may also be either acute or chronic. The acute form embraces those pneumonias or bronchopneumonias which are known as caseous, and in which we have the infection by the tubercle bacillus combined with that of other microbes. It is a mixed lesion. The chronic comprises the ordinary forms of tuberculosis, such as are found in the lungs, intestines, peritoneum, liver, meninges, etc.

Berggrün and Katz⁸ call attention to an important, though but rarely recognized, diagnostic symptom occurring in the chronic tubercular peritonitis of children, namely, the appearance of *colorless* "acholic" stools. This is due to the fact that they contain an abnormally large amount of fat. The bile, although poured out into the intestine in normal quantity, has largely lost its power of

digesting fat, though still retaining its antiseptic property. As the result, the light-colored acholic, though not putrid, stool is produced.

Prophylaxis.—Measures for the prevention of tuberculosis are directed, first, against the predisposition to the disease, and, second, against infection by the specific cause.

Volland¹³_{July 18} lays the greatest stress upon the correction of the constitutional predisposition. He says the greatest amount of good will be done by such treatment, early in life, as shall correct any possible constitutional taint. After infection has taken place in children the time for successful preventive treatment is gone. Children must be protected from the effects of so-called scrofula.

Behrens,¹⁸_{July 18} on the contrary, and far more properly and practically, holds that the benefits to be derived from the above measures are not founded upon facts. He claims that our principal efforts are to be directed against the dangers of infection, and this is to be done in the following way: (1) by educating the public on the infectiousness of this disease; (2) by sanitary regulations directed against infection by means of the sputum, more especially in places where a number of persons congregate; (3) by the removal of the dust of the streets by such methods as are deemed proper; (4) by the establishment of public disinfecting institutes and by the spreading of instruction in houses in which tuberculosis exists; (5) by the establishment of public hospitals for the tuberculous poor. Moreover, tuberculous patients should be forbidden such employment as may endanger the welfare of others, and the public should be protected from infection through the milk and meat of tuberculous animals. Rochelt,¹³_{July 18} dwells more especially on the *sterilization of sputum*. Spengler³⁴_{No. 46, 71} has found that the best antiseptic for this purpose is a *10-per-cent. solution of lysol*. Prausnitz³⁴_{No. 46, 71} makes a very practical suggestion that spit-cups should not contain disinfectant fluids, but rather be filled with "holz-wolle," or "excelsior," which would readily absorb the sputum and could be easily destroyed by burning.

Savizky⁵⁷_{Mar. 27} has investigated the *length of time* that inspissated sputum retains its infectious properties. He finds that sputum, dried and preserved in a condition similar to that which obtains in the ordinary residence, retains its infectiousness for two and a half months; that the virulence of such sputum becomes gradually

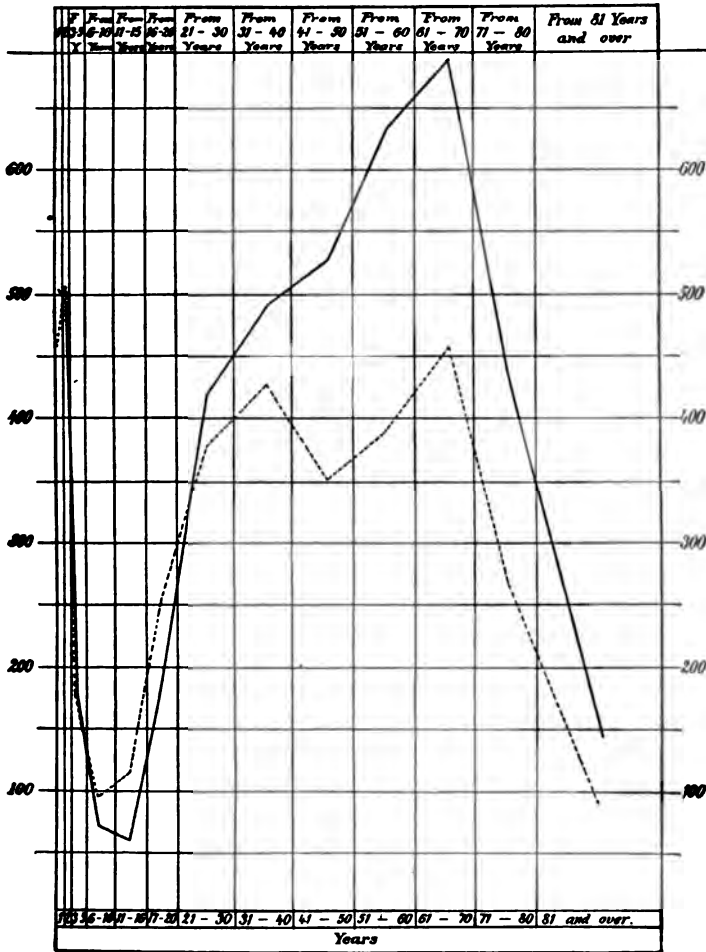
diminished, and that sputum exposed to the sunlight retains its infectiousness as long as that which is preserved in the dark. The destructive effect of sunlight, hitherto recognized, is observed in matter spread out in thin layers.

Perroncito ⁷³⁹_{Nov. 60} has thoroughly investigated the possible danger from the *ingestion of the flesh* of tuberculous animals. He inoculated two hundred rabbits, as many guinea-pigs, and two oxen with the fluid obtained from the muscles of tuberculous pigs. None of these animals became tuberculous. Eighteen young pigs were fed for a period of four months with the flesh of tuberculous cows. On post-mortem examination of these animals, no tuberculous lesions were found. On the whole, then, there seems to be but comparatively little danger in this direction.

Flick ⁹_{Nov. 11} gives a table of the general mortality and the mortality from consumption for the years 1861 to 1891, inclusive, together with the estimated population of Philadelphia for each year, and says that, if we study the mortality rates from pulmonary tuberculosis side by side with the number of deaths from the disease and the population for the thirty years as a whole, we shall see that during the entire period there has been no material decrease in the death-rate from this cause until the last few years—that is, since the doctrine of contagion has been more generally accepted; that the decrease becomes more rapid as we approach the present year,—the actual decrease from 1881 to 1891 amounting to a saving of seven hundred and eighty-four lives a year, reckoning from the present population. This most fortunate reduction can only be explained on the theory of the contagiousness of phthisis. Since this question has been agitated in the newspapers, most people, even though skeptical, have adopted preventive measures, and the majority of physicians have urged them to do so, while attending persons suffering from the disease. That so excellent a result should follow such trifling efforts is in accordance with what we know about the preventability of tuberculosis. All that is necessary is to confine and destroy the sputum, and the most intimate relations between sick and well can be safely maintained.

Zwikh ³⁴_{Nov. 1. 71} has determined, from the mortality statistics of Bavaria for the years 1888 and 1889, the mortality from tuberculosis arranged according to age and sex. The following curve

very well illustrates his results. It represents the mortality from tuberculosis in every one hundred thousand inhabitants, male and female, of the corresponding age.



PHTHISIS MORTALITY CURVE OF BAVARIA.
(Münchener medicinische Wochenschrift.)

Treatment.—The treatment of pulmonary tuberculosis in sanatoria is constantly receiving more attention. The shining examples of Brehmer and Dettweiler are bearing fruit. At the last meeting of the German Association for Public Hygiene, it was recommended that companies be formed whose object it shall be to found sanatoria for the tuberculous poor. It was more especially

dwelt upon that this was really the only successful method of treating tuberculosis. Similar views were expressed by Schrötter in an address before the Vienna Doctoren-Kollegium.⁵⁷

V. Y. Bowditch⁶¹ brought up the same subject, advocating it, and speaking of the excellent results which had been obtained at a small sanatorium under his control at Sharon, Mass. Probably in this form of treatment the climate is of secondary importance to a rigid attention to the minutest details which will go to increase the general health and resistance of the patient. It is to be recommended that such sanatoria be erected in the neighborhood of all large cities. What a boon it will be for the people when our State legislators shall be educated up to this level! The medicinal agents which have been recommended in the treatment of tuberculosis during the past year have not lacked in numbers.

Sommerbrodt⁴ has reported additional excellent results from the use of *creasote*. The earlier the drug is used, the better are the results. The author has employed it in scrofulous children with great success. It is, of course, to be combined with any other appropriate method of treatment. The chief point to be remembered, however, is the regular employment of large doses, which should be gradually increased to within from 3 to 4 grammes daily ($\frac{3}{4}$ to 1 drachm). The best form of prescribing the drug is in gelatin capsules containing 0.1 to 0.15 gramme ($1\frac{1}{2}$ to $2\frac{1}{4}$ minims) of *creasote*, with codliver-oil or olive-oil. It may also be mixed with 2 parts of tincture of gentian. It may be said that *creasote* is daily increasing in popularity. The tincture of *nux vomica* may be substituted for gentian with advantage.

Beverly Robinson⁵⁰ likewise reports excellent results with *creasote*, and recommends in addition the inhalation of the drug. Guiter³⁶³ also recommends *creasote*, but claims that it is not equally suitable in all cases, but that in those attended with high fever and a rapid pulmonary necrosis it may do harm. Penrose⁵⁹ reports over one hundred cases of pulmonary tuberculosis which had been treated with *creasote*. All showed improvement, though, owing to the advanced stage of the disease, none were cured. Many of the patients had returned to work who, in all probability, without this treatment would have succumbed to the disease. The employment of only the pure beech-wood *creasote* is urged.

Burlureaux³⁶³_{Mar.5} has studied the uses of creasote in determining the gravity of tuberculosis. The author divides tuberculous patients into four categories: 1. Those patients who tolerate the drug perfectly, show no untoward symptoms as the result of its use, exhibit marked improvement in the appetite, general health, and body-weight, and in whom the tubercular lesions are brought to a stand-still. 2. Those patients in whom the drug is equally well borne, but who, though showing a decided general improvement, give no sign of beneficial effect so far as the local disease itself is concerned. 3. In patients of the third class there is developed, after a period of tolerance, a sudden and marked intolerance without any apparent cause, and in whom after this the prognosis is very grave. 4. The fourth category of patients embraces those who from the beginning cannot tolerate the remedy, and upon whom no impression is made. The author regards the employment of creasote as a valuable agent in determining the prognosis in cases of tuberculosis.

The pharmacologists have endeavored to substitute for creasote chemically pure salts of *guaiacol*. Seifert and Holscher⁴_{No.51,71} recommend the use of guaiacol carbonate in doses beginning with 0.2 to 0.5 gramme (3 to 7½ grains), morning and evening, to be rapidly increased until 6 grammes (1½ drachms) a day are given. In the intestine pure guaiacol is formed, which is rapidly absorbed. The authors report among the most striking effects a very notable increase in appetite. Good results from this treatment have been reported by Diamantberger²⁴_{Dec.4,71} and Schuler.¹⁵⁰_{p.192}

Methyl-blue and *pyoktanin* have also been recommended by Althen,³⁴_{Jan.5} Gennaro Petteruti, and Giralamo Mirto.⁵⁸⁹_{Nov.24,25} The latter authors recommend the parenchymatous injection of pyoktanin in pulmonary tuberculosis, and report two cases in the advanced stage which had been benefited. [Inasmuch, however, as it has been definitely proven that these aniline dyes have absolutely no effect upon the tubercle bacillus, it is difficult to see how the good effect is obtained. Perhaps the drug may have influenced the growth of micro-organisms, which infected the lungs secondarily, the pus-formers, etc.—Ed.]

Nadaud¹⁰_{No.35,71} recommends the subcutaneous injection of 1 to 3 syringefuls daily of a 1-per-cent. solution of *aristol* and *creasote* in oil.

The latest reports on the Liebreich *cantharidinate* treatment substantiate what has gone before on this subject. It has a distinct action upon tubercular lesions, more especially those of the larynx, but its effects are too uncertain and too dangerous to recommend its general use. Demme¹¹⁶_{Mar., '01} reports favorable results in laryngeal cases. Fenwick and Wellsford²_{Dec., '01} speak very strongly against its use. Shurley and Gibbes⁸⁰_{May} continue to report favorable results from their treatment.

A host of antiseptic remedies to be used by inhalation have been recommended, with results highly gratifying to the recommenders. Just what effect, beyond the allaying of light catarrhal processes, such inhalations can have is difficult to say.

TUBERCULIN.

Tuberculin has been the object of a number of scientific researches during the past year, and it is a matter of congratulation that the period of excitement and invective has given place to a period of quiet and earnest work. It has been the endeavor of a number of scientists to determine the chemical nature of the remedy, and, if possible, isolate that which operates for good from that which may have a deleterious effect. In his last paper on the subject, Koch describes accurately the chemical properties of the albumose, or active principle, obtained by precipitation with alcohol. He said, however, that no advantage over that obtained with the crude tuberculin followed its use.

In the modification devised by Hunter, the albumoses, or active principle, are separated from the alkaloids, etc., by precipitation with sulphate of ammonia. The ammonium sulphate is gotten rid of by dialysis. It may be said that the albumose obtained by Hunter is the same as that obtained by precipitation with alcohol. The amount of alkaloids or ptomaines present in the crude tuberculin is too slight to be attended with any danger, as has been proven by the injection of the alcoholic filtrate. Moreover, in the process of removing the ammonium sulphate by dialysis, there can be no doubt that part of the active principle is lost by passing through the dialyzer; so that Hunter's modification is but a diluted tuberculin, and a very uncertain dilution at that.

The clinical reports following its use substantiate this view in every particular.

Klebs⁶⁰_{No. 25, '91} ascribes the deleterious effects of the crude tuberculin to the alkaloids or ptomaines present. His improved preparation, which he calls "tuberculoctidin," is tuberculin from which the alkaloids have been precipitated. He claims most excellent results from its use, without the deleterious effect accompanying the use of tuberculin.

Kitasato⁵⁸_{Aug. '90} has repeated Koch's experiments with tuberculin on tuberculous guinea-pigs. If a guinea-pig be inoculated with a virulent culture of tubercle bacillus, the animal dies, without exception, in about eleven weeks after the inoculation. It must be conceded, then, that any remedy which shall either prevent death or lengthen this period must have some curative effect upon the disease. From his experiments upon fifty animals, the author found that this period was materially lengthened, and that he obtained better results with tuberculin than with any other material or combination of materials. The greater the period of time which had elapsed between the infection and the beginning of the treatment, the shorter was the life of the animal. He obtained the best results when he began his injections the second week after the inoculation. He found that the injection had a favorable influence upon both the external and internal tuberculosis of guinea-pigs, more especially upon tuberculosis of the lungs. He found, moreover, that those animals which he had cured of an attack of tuberculosis by means of tuberculin were, for a period of time not as yet established, immune to a second tuberculous infection. The same results in producing immunity to a second attack were obtained by Tizzoni and Centanni.⁵⁸⁹_{p. 204, '91}

Botkin⁶⁰_{No. 16} examined the blood in patients in whom tuberculin injections had been made, and came to the following conclusions: (1) an acute leucocytosis is produced; (2) on the day after the reaction the number of leucocytes in the blood rapidly diminish, probably most of them being disintegrated. This conclusion is based on the increase in the number of blood-plates. This latter phenomenon occurs at that period when the temperature has fallen to its lowest point, succeeding the febrile reaction. The tuberculin reaction may, however, occur in the blood in cases where the temperature does not rise.

Diagnostic Value.—The value of tuberculin as a means of diagnosing the presence of tuberculosis in the lower animals

has been insisted upon by many competent observers. Bang²⁰⁶ injected 53 animals, in 41 of which the post-mortem examination disclosed tuberculous disease. Of these 41, 38 gave a typical reaction; in 3 the reaction was insufficient. Of 12 healthy animals, 2 gave a very insignificant reaction. Johne and Siedamgrotzki obtained similar results. Lydtin injected 80 animals selected at random. Of these, 18 showed reaction, of which 17 were found tuberculous. Of the remaining 62, where no reaction had occurred, none were found tuberculous. In another series, 19 strong, apparently healthy milk-cows were injected. Of these, 9 showed the reaction, and were found, on post-mortem examination, to be tuberculous. Roeckl and Schutz injected 60 animals, with a positive result in 51. Of these, 43 were found to be tuberculous. Of 15 animals with a negative result, 4 were found with evidence of the disease.

Nocard¹⁰ experimented upon 71 animals, all of them being subsequently examined post-mortem. Of these, 22 showed the reaction; examination revealed tuberculosis in 21, and in the other animals a general lymphadenitis was found. Of the remaining 49 animals, where no reaction took place, 3 were tuberculous. Of 18 milk-cows, 2 reacted, and were found tuberculous. So that, while this diagnostic agent is not infallible, it is yet of very great value, indeed,—especially in doubtful cases.

The method employed by Nocard was the following: 0.30 to 0.40 gramme (4½ to 6 grains) of tuberculin are to be injected. As a rule, in tuberculous animals, a rise of temperature of from 1° to 3° C. (1.8° to 5.4° F.) occurs in from nine to eighteen hours after the injection; the rule is from twelve to fifteen hours. In healthy animals this does not occur. Further, that a rise of 0.8° C. (1.4° F.) does not establish the diagnosis; with a rise of 0.8° to 1.4° C. (1.4° to 2.5° F.) tuberculosis should be suspected. A higher temperature establishes the diagnosis.

Therapeutic Value.—The experience of the numerous clinicians has been varied. Steffen²⁶⁶ treated thirty-four tuberculous children—as a rule, favorable cases—with injections of tuberculin. The greatest precautions were employed. Of these, the author says that fifteen were cured. He says, however, that the treatment must be kept up for a long time, and that immediately on the re-appearance of any tuberculous

sign treatment must be resumed. Escherich³⁶⁶_{p.366} also reports, as a rule, favorable results in children. He recognizes the diagnostic value of tuberculin in children. The cases of lung tuberculosis treated with medium and large doses became worse. The cases of meningitis, tubercular peritonitis, tuberculosis of the glands and bones showed no beneficial effect. Tuberculosis of the skin and the superficial scrofulous affections showed marked, though at times only temporary, improvement. Escherich recommends the use of minute doses. The experience of Borntraeger,⁶⁹_{No.12} in twenty-one cases, was not very favorable.

Spengler⁶⁹_{No.12} is delighted with the results obtained from the use of a combination of tuberculin and Klebs's tuberculocidin. It may be remarked, however, that this observer's experience was obtained at Davos, an excellent hygienic resort.

In this country favorable results have been reported, chiefly by the observers Denison, Ruck, etc., whose patients have had the advantage of excellent climate and close attention to every detail. The opinion of the most competent observers on this subject is, that tuberculin, to have proper trial, should be combined with every hygienic and medicinal measure, with every attention to the details; above all things, that the treatment should be begun as early as possible. It is to be remembered always that phthisis pulmonum, as we see it, is very largely a mixed infection; that tuberculin, while it has a specific effect against tubercular lesions, has none, or, perhaps, even a deleterious effect, upon lungs infected with other micro-organisms. We can only hope for success in the treatment of those cases where the disease is in its earliest stage, and in which the lungs have not been riddled with pus-formers. It is still true that tuberculin radically addresses the products of tuberculosis, but not those of sepsis. The best results with tuberculin will be obtained in the decades of the new century.

CROUPOUS PNEUMONIA.

The pneumococcus of Fraenkel is accepted by the mass of authors as the specific cause of this disease. There are, however, a number of details concerning its pathogenesis that still require elucidation. As is well known, the pneumococcus is found in the sputum of healthy persons, so that there must be conditions which give to the germ its intense pathogenic properties. With

the view of studying the method of infection, Sachs ³⁰⁷⁵_{v.1, No. 4, '11} conducted the following investigations: In the first experiment, 2 cubic centimetres (32 minims) of fluid obtained from the lung of a man who had died of pneumonia were injected, with the strictest aseptic precautions, into the right lung of a sheep. Blood obtained from the vein of the right lower extremity two days after showed numerous pneumococci. The germ was also found in the pleural exudate. The animal suffered from a typical attack of pneumonia, the temperature reaching 41.9° C. (107.5° F.); it fell to the normal in eight days. Fifteen days after the injection, however, the animal died. A metastatic pericarditis was found post-mortem, the exudate containing the pneumococci. A mouse inoculated with this exudate died in eighteen hours.

Into the peritoneal cavity of a rabbit were injected 2 cubic centimetres (32 minims) of pneumonic sputum. At the same time a white mouse and guinea-pig were also inoculated. The mouse and rabbit died in sixteen hours; the guinea-pig not being affected. Four cubic centimetres (64 minims) of the peritoneal exudate from the rabbit were injected into the trachea of a hog. The animal died in forty-two hours, suffering from severe dyspnoea. In the skin, at the point of the injection, developed an extensive phlegmon. The right lung showed red hepatization, and contained pneumococci. Into the trachea of two hogs were then injected 2 cubic centimetres (32 minims) of fluid obtained from a lung in the condition of red hepatization. The animals sickened in two days, but did not, however, succumb to the disease. The trachea of one of the animals had been wounded with a blunt instrument before the injection, in order to study the possible influence of the wound upon the development of the germ. This animal showed normal lungs seven days after the injection. It seems, then, from this experiment, that disease follows the infection with the germ only when certain predisposing conditions are present. Hans Brunner, ³²⁶_{v. 46, p. 1, '11} from an analysis of the cases of pneumonia occurring in the Zürich Hospital, classifies these predisposing conditions as follows: (1) individual peculiarities of constitution; (2) acquired predisposition, such as is brought about by previous attack of pneumonia; (3) some accidental predisposing condition, such as overexertion, atmospheric influences, climate, season of the year, etc.

Bordoni-Uffreduzzi ⁸¹⁹_{No. 17} has studied the resistance which the

pneumococci in the sputum offer to various atmospheric influences. He found that pneumonic sputum which had become inspissated from exposure to a diffuse daylight for a period of from nineteen to fifty-five days retained the property of producing a typical septicæmia when injected into animals. Exposure to the direct sunlight for a period of twelve hours, while it lessened the virulence of the sputum, did not completely destroy it. The author strongly recommends the disinfection of pneumonic sputum.

An epidemic of infective pneumonia, which is supposed to have been connected with the arrival and distribution of an invoice of *parrots*, is reported from Paris by Gaston. ³⁸⁰_{May, 1888} In eleven cases, of which the details are given, the illness manifested itself by an initial headache, severe pain in the side, rigor, and rise of temperature; in the next twenty-four hours signs of pneumonia supervened. The patients had a typhoid appearance, diarrhœa, and in some cases petechiæ. In a few cases false membranes in the throat were seen. The disease terminated rapidly either in death or prolonged convalescence. Post-mortem, all the internal organs were found engorged. The lungs were in a condition of hepatization, with numerous broncho-pneumonic foci. In one case a recent endocarditis was observed. It was believed that the disease had been communicated by the imported parrots. Gaston, however, does not accept this view, but concludes that the epidemic was one of infective pneumonia, and that its severity was due to unsanitary conditions and the defective health of those attacked. The parrots may have favored the propagation of the disease by carrying the infective material in their plumage, etc., from individual to individual.

Zimmerman ²¹⁴_{Sept.} has contributed a very interesting observation illustrating the contagious character of pneumonia. In a family which he attended the father contracted a typical croupous pneumonia in the lower lobe of the right lung. On the third day of the disease the patient's daughter, a 4½-year-old child, became similarly affected. The information was given that the child had slept with the father for two nights. Four days after the initial attack of the father, a second child showed distinct signs of the disease. The next day the third child presented the initial symptoms,—high fever, chill, vomiting, and consolidation of the right lung. The author concludes that there can be no doubt but what these

were cases of croupous pneumonia, due to the specific pneumococcus. He adds, however, that it is quite possible that certain predisposing causes were present in the family, which enabled the contagion to be transmitted from the father to the other members of the family.

Pathological Anatomy.—Davidson²⁰_{no. 127} reports a case in which fibrinous pneumonia resulted in caseous hepatization. The patient was a young man, in whom the disease occurred secondarily to an attack of typhoid fever, and was of the character known as pneumonia migrans. The disease was characterized by marked variations of temperature, signs of the formation of cavities, and the presence of tubercle bacilli in the sputum. Post-mortem were found a reddish-gray hepatization in both lungs, with points of caseous degeneration in the right lung. Microscopically, these points showed very distinctly at their borders that they had resulted from a previous red hepatization. Isolated tubercle bacilli were found in the caseous nodules.

Queyrat¹⁰⁰_{June 18} makes an exhaustive analysis of the affection known as the disease of Grancher, or *spleno-pneumonia*. His conclusions are, that it is a pneumopathy which clinically simulates a pleural effusion. The symptomatology varies according to the different anatomical conditions, viz., the disease may develop very slowly, or with exceeding rapidity. It is found both in children and in adults, but more often in the adult. The symptomatology is the same in both. It is much more frequent in men than in women, and is more often found in the left lung than in the right. Of the pathology but very little is known. The disease seems to show itself more frequently in persons suffering from albuminuria or tuberculosis. Faisans⁷³_{July 27} claims that it is a frequent manifestation of *la grippe*; that, like pneumonia, it may give rise to a purulent pleurisy. In one of the cases which he reported streptococci were found in the pleuritic pus.

Goldscheider⁶⁹_{Apr. 7} has reported an extremely interesting case of *pneumonia*, occurring during the epidemic of *influenza*, which was complicated by an attack of *erysipelas*. The history was briefly as follows: The case was one of very severe lobar pneumonia of the left side, with marked initial chill, cough, and pleuritic pain. The disease ended in a protracted crisis after fifteen days. Pneumococci were found in the blood on microscopical examination.

Pure cultures were also obtained and successfully inoculated. On the sixth day of the disease the patient gave birth to a living eight-month child. The child died on the sixth day, of a subcutaneous inflammation. In the skin were found the erysipelas streptococci. The pneumonic crisis occurred in the mother on the fifteenth day. On the sixteenth, or the tenth day of the puerperal period, there developed erysipelas, starting from and spreading itself over the back and thighs. The erysipelas subsided on the nineteenth day. The patient recovered after a prolonged convalescence. We have here a case of double infection, in which, as it seems, the pneumonia inhibited the development of the erysipelas. While such cases are rare, several of them have been reported. The case cited above is one which establishes the possibility thereof beyond the shadow of a doubt.

Prognosis.—For some time it has been well known that, in the course of croupous pneumonia, the number of *white corpuscles* in the blood is considerably increased. The observations of Kikodze show that this increase is not observed in cases which terminate fatally. This remarkable difference induced Tchistowitsch ²⁰² _{V.A.No.7; Mar.} ⁹⁰ to study the question by experiments on the lower animals. In rabbits inoculated with the pneumococcus, the leucocytosis only occurred in the case of animals which did not die; whilst, on the contrary, in those cases in which the disease proved fatal, a diminution of white corpuscles occurred. The corpuscles were counted with the Thoma-Zeiss apparatus some days before the inoculation and after the infection. The white blood-corpuscles, in the cases not terminating fatally, increased from about 9000 to 17,000 per cubic millimetre, and the diminution in the fatal cases was from about 10,000 to 3000. Tchistowitsch adds that observations in man might allow important conclusions to be drawn as to the prognosis of the disease.

Von Jaksch ³¹⁹ _{Feb. 6} has confirmed these experiments, and has frequently observed that the prognosis in those cases of croupous pneumonia where this leucocytosis is not present is very unfavorable. He recommends, therefore, that in these cases such drugs which increase the number of white blood-corpuscles should be employed. These remedies are pilocarpine, antipyrin, antifebrin, and nuclein. He reports a case where, by the use of pilocarpine, the number of white blood-corpuscles was increased.

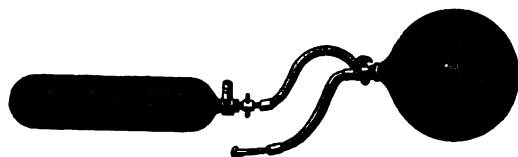
Treatment.—Petresco⁶⁷ urgently recommends the employment of large doses of *digitalis* in the treatment of pneumonia. His conclusions, as the result of a large experience with this remedy, are: Pneumonia can be jugulated by the use of large doses of *digitalis* when given at the onset of the disease. This abortive treatment is the more rational because it is based on the pathogenic indications peculiar to the disease. The efficacy of the treatment is confirmed by statistics, which show a greatly-reduced mortality in cases treated by large doses of *digitalis*. He claims that a dose of from 4 to 8 grammes (1 to 2 drachms) of *digitalis*-leaves, given in an infusion, is the only true therapeutic dose of *digitalis* for pneumonia. The author insists on the absolute non-toxicity of this amount of *digitalis* when given in pneumonia. Löwenthal,¹⁰⁰ after the use of this treatment in twelve cases of uncomplicated pneumonia, concludes that *digitalis*, even in the dosage recommended, has no specific or jugulating effect in pneumonia. He says, however, that one need not be afraid of extraordinary toxic effects from the use of 3 to 4 grammes ($\frac{3}{4}$ to 1 drachm) of *digitalis*-leaves in an infusion *pro die*; that he has frequently seen a healthy heart-action obtained by the use of such doses where a smaller dosage did not suffice. Fikl,⁸⁴ recommends the use of *digitalis* in doses of 3 grammes (46 grains) and more a day, combined with the use of alcohol.

Lauder Brunton and Prickett,² recommend the *inhalation of oxygen* and hypodermatic injection of *strychnine* as respiratory stimulants. They report a case of double pneumonia which was aroused from an almost moribund condition, due to an intense cyanosis, by the use of this treatment. Unfortunately, however, the case did not recover; but the exceedingly beneficial action obtained from the inhalation has led the authors to recommend its use. Foy,² described a case of double pneumonia attended by intense cyanosis successfully treated by inhalations of oxygen. At the beginning of the treatment 16 ounces (480 grammes) of blood were drawn from the median cephalic vein. Succeeding this, the symptoms of cyanosis recurred; so that the inhalations of oxygen were administered every three hours, for fifteen minutes at a time, for ten days. The case ended in complete recovery. The author has devised a special apparatus to be used in connection with the cylinders of compressed oxygen of commerce. The ap-

paratus consists of two tubes and a rubber bag of the capacity of 1 gallon (4 litres). The one tube passes from the nozzle of the oxygen-cylinder to the rubber bag, and the other, passing from the rubber bag, ends in a vulcanite mouth-piece, which, during use, is placed between the patient's teeth. The attachments to the rubber bag are made by means of a "three-way" cock.

Collier and Symonds⁶ Feb. 27 have used oxygen in a case of broncho-pneumonia following influenza attended with intense cyanosis and signs of asphyxia. They used it, however, continuously, and found that the patient became worse when, through an accident, the inhalation was stopped. The patient ultimately recovered.

Lépine²¹ Apr. 17 has employed the unique plan of Fochier, namely, that of producing an *artificial abscess*. By the subcutaneous injection of 1 cubic centimetre (16 minims) of turpentine an aseptic abscess is produced. In a case in which the author had employed this treatment a beneficial effect was observed. Gingeot³ May 18 also



OXYGEN-INHALER.
(British Medical Journal.)

reports a grave case successfully treated by this method. Injections were made in the arms and thighs, and were followed by suppuration. The case ended in recovery. The author rejects the theory of Fochier, namely, that these artificial abscesses check the inflammatory action of the lung by "fixing it elsewhere," and adopts the explanation given by Chantemesse,—which seems more probable,—that the production of the abscess brings about a *leucocytosis*, by means of which greater phagocytic effect is produced in the diseased area.

Similar successful cases are reported by Bard²¹¹ Apr. 17 and Boliver.²⁰⁸ Jan. 1 Klemperer³⁴ May has reported the results obtained by the specific treatment of croupous pneumonia in twelve cases by the serum obtained from the blood of rabbits which had been rendered immune to the disease by the injection of heated pneumococcus cultures. The dose of blood-serum at each injection was from 5 to 10 cubic centimetres (1½ to 2½ drachms), injected into the

gluteal regions. No deleterious effects were observed. Of the twelve cases, the crisis occurred in five very soon after the first injection ; so that Klemperer does not include these in his deductions. In the remaining seven cases there occurred, after the injection of serum, a diminution of temperature, pulse, and respiration, from which he concludes that the serum has, without doubt, an antitoxic effect, and that probably better results would be obtained if the serum were taken from larger animals, such as the horse, sheep, etc. For this, of course, large institutions are necessary.

Klemperer also reports the results in eight cases treated by the injection of *pneumococcus cultures*, which had been heated to 60° C. (140° F.). The idea in this treatment was to introduce the immunizing substance into the body, from which the animal organism itself should form the antitoxin. Experiments in animals have shown that this antitoxin begins to be formed in twenty-four hours after the injection, and is completed in two or three days. Cultures thus treated have no toxic effect. Should this method prove a success, it would possess a great practical advantage over the serum method, in that the immunizing substance is much more easily obtained. The eight cases treated in this manner showed very good results. Beginning from twelve to twenty-four hours after the injection, the temperature gradually fell. The toxic symptoms at the same time were diminished. The fall of temperature was not constant, but was subject to variations. With the re-elevation of temperature a second injection was made. Some of the cases were very severe, occurring in old people, or those with organic disease of the heart.

Lichtheimer⁶⁹_{Jan 22} reports a very interesting experiment of a similar kind. Instead, however, of obtaining the serum from immunized rabbits, the author injected *blood-serum obtained from a man* who had but recently recovered from an attack of pneumonia. The reasoning here was, that the blood-serum would contain the antitoxin produced in the natural cure which had occurred. The first case, one of well-marked croupous pneumonia in the left lower lobe, was treated by the intra-venous injection of 130 cubic centimetres (4½ ounces) of serum obtained from another case of pneumonia, in which venesection had been performed two days after the crisis. Soon after the injection the temperature began to fall, and that same evening fell to 36.6° C. (97.8° F.), accom-

panied by profuse perspiration and slowing of the pulse. The temperature showed no subsequent rise. In the second case there had existed for four days croupous pneumonia of the left lung, and, at the time of the injection, the patient showed slight delirium. This patient was treated as above, by the injection of 70 cubic centimetres ($2\frac{2}{5}$ ounces) of the same serum. The temperature fell to normal in the course of the day. Six days afterward a slight rise of temperature was noticed, due to a serous pleural exudate. This was aspirated, and was followed by recovery. Fifty cubic centimetres ($1\frac{1}{10}$ ounces) of this pleural exudate were injected into the vein of another pneumonic patient on the fourth day of the disease. The temperature fell from 40° to 37.9° C. (104° to 100.2° F.), accompanied by profuse perspiration and a general feeling of comfort. The temperature, however, rose again slightly, the rise being accompanied by a very slight serous pleural exudate, which disappeared, however, in the course of two days.

Charles Jansson³⁷⁰_{p. 388} reports the results obtained from the treatment of 10 cases of pneumonia by the injection of the serum of immunized animals. No result was obtained in 1 case; in 3, temporary fall of temperature was observed. In 5 other cases in which the temperature fell it was ascribed to the occurrence of the crisis. In the tenth case, a confirmed alcoholic syphilitic, the injection was followed by a really marvelous result. The patient, who was delirious and moribund, showed a marked improvement almost at once.

BRONCHITIS.

Bronchitis militinosa is a special form of disease observed by Regnault and Sarlet,³⁴⁶_{v. 30, No. 3, 71} consisting of attacks of dyspnoea and spasmodic cough, which increased, but without the appearance of fever. Marked anæmia and yellow-colored spots of skin were made prominent by air. Picric acid was discovered in the urine.

An interesting case of bronchitis fibrinosa is reported by Koch, of Dorpat,²¹_{v. 1, 20} and a similar case by Jozefowicz.⁵⁹_{Mar. 19}

The use of oxygen is recommended by Langston.²_{Jan. 30} A patient treated by him was completely insensible, with great cyanosis of the face, lividity of the finger-nails, irregular respirations, and a very small, compressible pulse; in fact, *in extremis*. After inhalations of oxygen she improved, and was for a time comparatively comfortable, but died later, the supply of oxygen having run out.

The chief interest in the case was the possible recovery, when *in articulo mortis* from asphyxia, from accumulation of secretion in the bronchial tubes. The question of temporary consciousness for signing a will or legal document is of interest.

The systematic daily practice of full, deep inhalations of pure atmospheric air, and the judicious exercise of the deep muscles of the chest, according to Cassell, ²²⁴_{Feb. 13} will do more to remove all symptoms of bronchial disease and preserve the general health than all the medicines in the pharmacopœia.

The fluid extract of eucalyptus has been used with considerable success by Edwards. ⁷⁷_{Aug.}

PLEURISY.

Inflammation of the serous membranes is defined by Guerin ¹⁰_{Apr. 23} as an exaggerated invasion of the lymphatic territory by the elements of the blood. Pleurisy excited by the typhoid-fever bacillus is reported by Ketsch. ⁹⁹⁸_{Apr. 26}, ¹²¹_{Aug.} Eberth's bacillus was the only micro-organism found present in the fluid obtained by puncture. Tuberculosis was, however, present. The author is certain that the pleurisy was due to the bacillus of Eberth, the disease remaining confined to the pleura. Syphilis as a cause is mentioned by Praetorius. ⁵⁷_{Aug.} In the one case, the syphilis occurred nine years before. Nikulin ³⁷⁹_{No. 106} distinguishes three forms of syphilis of the pleura: that in which syphilis has spread from the lungs to the pleura (syphilitic pleuro-pneumonia); that in which syphilis has set up costal periostitis, and then spread from the bony chest-walls to the pleura (peripleuritis syphilitica); primary syphilitic pleurisy. All treatment failed until potassium iodide was tried, which gave prompt relief.

Hæmorrhagic pleurisy, according to Maragliano, ⁴¹_{Jan. 22} is dependent, in all cases, on dyscrasia.

Jakowski ⁵²⁰_{Mar. 12, 19} made bacteriological examinations in 52 cases of pleurisy. Thirty were serous and 22 purulent; 10 primary and 13 of tubercular origin; 14 developed during pneumonia and the rest in the course of other diseases. In 7 cases of primary pleurisy he found Fraenkel's pneumococci, which he regards as the most frequent cause of the disease. In the remaining 3 cases he affirmed the presence of the staphylococcus, and its appearance in serous exudation predicts the tendency to purulence, thus ren-

dering the prognosis more grave. Pleurisies from pneumonia depend principally on Fraenkel's pneumococci. In two cases of pleurisy during acute rheumatism he found the staphylococcus; also in one case of croupous pneumonia. Fraenkel's pneumococci were found in one case of pleurisy complicating Bright's disease and in another complicating pericarditis. The author does not believe that there is inflammation of the pleura independent of micro-organisms, though it is not always possible to discover them.

Rheumatism in its connection with pleurisy is very ably discussed by Fiedler, ¹⁸ _{no. 1, May 28}, ¹⁹ who believes that acute rheumatic polyarthritis is very frequently associated with inflammations of the pericardium, endocardium, and pleura. This does not occur necessarily after the most severe cases of rheumatism, but may follow one so slight as to be frequently overlooked. It is his belief that the infectious matter of rheumatism after entering the circulation causes, primarily, certain general disturbances of the organism, then locates itself upon and in the serous membranes.

Pleural effusion associated with disease of the abdomen has been noticed by Lawson Tait. ² _{no. 2} One case was that of cancer of the ovary, associated with secondary cancerous growth in the pleura. He cited a number of other cases where he refused to operate, and gave an unfavorable prognosis, on the ground that the sanguinolent character of the pleural effusion was a certain indication of malignant disease. As a contrast, however, he mentioned one case of double effusion into the pleural cavity with a markedly bloody character, and with ascitic effusion into the peritoneal cavity. This, also, was sanguinolent and associated with a tumor. The tumor was removed, and proved to be a fibroid of the ovary, and the operation terminated successfully.

Treatment.—Internal remedies, whether antirheumatic, diuretic, or sudorific, in the opinion of Germain Sée, ²⁶ _{no. 1}, are useless in pleurisy. Expectation is the only rational plan, as pleurisy always goes through regular phases in a period of from two to three weeks, and until that time medical treatment is of little avail. This same author ³⁷⁹ _{no. 10} regards pleuritics as patients afflicted with tuberculosis in an evolutionary stage, and recommends that they should be treated in the same manner as consumptives.

Antipyrin in the treatment of acute and chronic pleural effusions is recommended by Clément. ⁵ _{no. 1} To be effective, it must

be given in doses of 15 grains (1 gramme) every four hours, and continued in somewhat smaller doses for several days after the disappearance of the effusion, which may result in from one to four days. Purulent or bloody effusions are not favorably affected.

Massage as a method of treatment in pleurisy is advocated by Poliakoff, ⁵⁸⁶_{No. 32, '71} who used it in eleven cases of sero-fibrinous pleurisy, and recommended the treatment in connection with other medication during the early stages of the disease, before the appearance of the exudation. If during the treatment the temperature increases, it becomes necessary to make an exploratory puncture, and, if pus be found, massage is contra-indicated.

Salicylates, according to Koester, ¹¹⁶_{Me.} have not become so general as they deserve to be in the treatment of pleuritic effusions. In his cases absorption commenced almost at once, and in from one to five days even large effusions had disappeared. Talamon ⁸¹_{J. med. 14, '71} also highly recommends the salicylate of sodium, but is not inclined to agree with Stiller that it acts simply as a diuretic. He regards the experiments of Rosenbach and Pohl as of great importance, as showing that the salicylates, when introduced into the digestive tract, are to be found later in all the serous cavities of the body,—those which are normal, as well as those in a morbid condition. Hence they even advise the injection of the drug into the pleural cavity after the evacuation of the liquid by aspiration. Similar views as to the efficacy of the salicylates are held by Mercandino. ⁵⁸⁹_{No. 289, 290, '90}; ¹³_{No. 1}

The inexpandibility of the lung after opening the chest for empyema, which Richards considers a serious matter, is due to the postponement of pleurotomy, and would be obviated were that operation performed before the lung had been coated and bound down by false membrane. Costotomy is a proper procedure, according to Ferguson, ⁴⁰_{Me.} in prolonged purulent discharge, if there is reason to believe that there is no tubercular complication or involvement, if the patient's condition will admit of the procedure, and if the present opening drains the cavity; so that pocketing is not the cause of the failure to heal. If, however, the drainage is complete and no tubercular deposit exists, and if drainage was established before the lung was bound down beyond the probability of expansion, or before perforation communicating with a bronchus has occurred, section of the ribs will rarely be required.

The justifiability of removing the whole lung near the root, where that organ is of no future use and in a collapsed state, is suggested by Croft. ⁵⁹_{Aug. 27}

ASTHMA.

Glandular asthma is shown by Joal ³⁶⁰_{Apr. 21} to exist in infants at times as symptomatic of tracheo-bronchial adenopathy. The bronchial glands are often the site of congestive and inflammatory conditions following bronchitis, measles, pertussis, etc. The determining causes of attacks in this class of cases are those which produce fluxion toward the intra-thoracic glands,—emotions, weeping, effort, variation of temperature, chilling, etc. Glandular asthma is to be suspected if the paroxysms return, especially by day, after efforts and movements; if they appear and disappear coincidentally with the swelling of the glands; if they coincide or alternate with pertussis, vomiting, palpitation, aphonia, or persistent hoarseness.

Although the view that the spasm of asthma depends upon the contractility of the circular muscular fibres of the bronchi, and that it is essentially spasmodic in character, has been again attacked, Wilson Fox ⁷⁶⁰_{Apr. 3} adheres to this view, and believes it to be the only one by which the phenomena of the disorder can be adequately explained.

The frequent occurrence of asthma among persons who in their youth suffered from stubborn cutaneous eruptions is observed by van Noorden. ¹¹⁴_{Jan. 22}

On account of being able to occasion an attack of asthma by placing a cotton tampon between the concha and the septum, thereby exerting a pressure on the superior part of the latter, Torstensson ⁶⁷⁸_{No. 18, 21} believes that the disease is, in most cases, caused by pressure. The author has observed many cases of unilateral asthma where the concha was swollen only on the one side, and where bronchial spasm and exudates were only found in one lung.

Preparations demonstrating the pathology of asthma were made by Schmidt ⁶⁹_{Aug. 4} to the German Congress für Innere Medicin. The spirals of Curschmann, in their formation, were not limited to any particular part of the bronchi, but were absent in the alveoli. Schmidt did not find the eosinophile cells increased in the blood of asthmatics, and did not consider their presence of special significance.

Treatment.—A writer¹²¹ recommends a mixture of equal parts of lobelia, stramonium, and green tea-leaves, rolled into a cigarette and smoked, as a relief in asthma. The leaves are well mixed and soaked for a time in a solution of potassium nitrate. They are then dried, and kept for use in a large-mouthed, well-stoppered bottle.

The mechanical treatment of asthma is carried out by Goebel⁶⁹,⁵³ as follows: The posterior portion of the chest is rapped quite violently until the entire thorax is set into violent vibration. This improves the circulation, and also favorably influences the emphysema upon which the disease is based, stimulates the atrophic vessels, and thus indirectly betters the nutrition of the lung. The writer has obtained such good results that he feels justified in bringing it before the profession, although he has not used it in a very large number of cases.

Treatment of the crisis in cardiac asthma is conducted by Ferrand¹⁴,¹⁶ as follows: (1) place the hands in a dish of hot water; (2) give inhalations of ammonia; (3) give, every five to ten minutes, about 3 drops of laudanum in cherry-laurel water. Inject subcutaneously morphia and atropia sulphate. The application of ice over the spinal column has proven very beneficial in the hands of Kinnear.¹ It lessens the congested parts, and this surcharge of blood goes elsewhere in the body, where it does good instead of harm.

Dieulafoy¹⁷,⁸⁰ treats asthma as follows: On the commencement of the attack a piece of cotton wet with cocaine (strength, 1 to 20) is applied to the nasal fossa, as far back as possible, or the solution may be dropped into the nose. If this does not succeed, the patient is to respire freely from 6 to 12 drops of pyridin from a handkerchief; as a last resort, morphine hypodermatically is given. For the relief of the tendency to asthma, the three medicaments advised are iodide of potassium, belladonna, and arsenic. A severe hardening treatment of the skin through baths has helped in some of the four hundred cases treated by Torstensson,⁶⁷⁸ in others it was without benefit.

Euphorbia pilulifera has been found empirically to have a most beneficial effect in asthma.⁸⁰ It may be employed alone, or in combination with several depressants, to the pneumogastric nerve. A prescription containing the anti-asthmatic, euphorbia, to which is added nitro-glycerin, is a powerful depressor of the vagus nerves.

This action tends to relax muscular fibres which are contracted in spasm. To it may be added lobelia, which has a similar effect on the vagus, and the iodide of sodium, which alters abnormal secretions and promotes normal function in the respiratory passages, so far as secretions are concerned. Bromide of potassium tends to decrease reflex activity, and so lessens spasm, in addition to quieting nervousness and relieving insomnia. In obstinate cases the euphorbia pilulifera may be given in separate doses, to the extent of $\frac{1}{2}$ to 1 drachm (2 to 4 grammes), in addition to the prescription already named.

PULMONARY TUMORS.

A case of primary endothelial cancer (lymphangitis proliferans) is reported by Fraenkel.⁶⁶ The differential diagnosis from carcinoma is made on the ground of the microscopic consistency. Primary lung and pleural tumors are fully discussed by Schwalbe.⁶⁸

A cancer of the right bronchus, just below its point of origin from the trachea, is reported by Oesterreicher.⁶⁹ The tumor extended some distance into the left bronchus and was ulcerated. Near to the tumor the lung had become gangrenous. From the position of the tumor the left bronchus had become considerably narrowed. The parts of the bronchi below the tumor showed some dilatation of the veins. There was also compression of the superior vena cava, the aorta, and the œsophagus. Three interesting cases of lung-tumors are reported by Fraenkel,⁶⁹ and the diagnosis of tumors of the thoracic cavity is thoroughly discussed. A case of primary cancer of the right lung with co-existing Bright's disease was described by Lecch.² The lung was diminished in size, owing to extensive pleuritic effusions, the pleura was much thickened, and the lung infiltrated by cancerous growth. Secondary deposits were found in the left lung, the left supra-renal gland, and in both kidneys, which also presented parenchymatous changes.

A case of primary encephaloid sarcoma of the lungs, an extremely rare disease, is reported by Vandervelde.¹⁵¹ At the autopsy, the right lung was friable and hepatized. Its surface was covered with soft, yellowish material, infiltrated with milky fluid, and with small, round, embryonal cells. In its centre there was a large cavity, around which the cells had undergone mucoid degen-

eration. The cavity contained blood-clots and pulmonary detritus. Cases of carcinoma of the lung are reported by Klemperer. ⁶⁹ June 2; July 28. A case of hydatid of the lung is reported by Mackenzie, ² Apr. 16 which proved fatal after rupture into a bronchus nine hours after aspiration. He has seen five cases during the past two years, and queries whether hydatids are becoming more common in England. Cases are also reported by Laveran. ⁸¹ Feb. 4. A case of actinomycosis of the lungs and vertebral column is reported by Heuck. ⁸⁴ June 16; July 18. Post-mortem showed an abscess-cavity over the fourth to the eighth ribs on the left side, the muscles being destroyed and some of the ribs laid bare. Inside of the chest and in a corresponding position there were some puriform masses and communication existed with the above-named abscess-cavity. Above, the lung was adherent to the chest-wall. The lower left lobe was airless and solid. The last two dorsal and upper two lumbar vertebræ were considerably destroyed, especially on the left side, and the pus contained the actinomyces. In sections from the lungs and the walls of the pleuritic abscess the ray-fungus was demonstrated. It was also present in the teeth. The bronchial glands, liver, spleen, and kidneys were free from the fungus.

DISEASES OF THE HEART AND BLOOD-VESSELS.

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DISEASES OF BLOOD-VESSELS.

Diagnostic Value of Tracheal Tugging in Thoracic Aneurism.—Grimsdale, of St. George's Hospital, London,¹⁵ criticises some of the conclusions of Macdonnell, of Montreal, a summary of whose article, with the above heading, may be found in the ANNUAL of 1892 (vol. i, B-1). Macdonnell asserts "that tracheal tugging does not occur in health, or in any disease except aneurism." Grimsdale brings forward the results obtained in an examination of 118 patients, some medical and some surgical, taken at random, to disprove this proposition. Of this number, tracheal tugging was found by the writer and Ewart to be present in no less than 51 cases. In 55 female cases, tracheal tugging was found in 15 instances; while of the 63 males, 36, or just over 57 per cent., presented it in more or less marked form. The cases which showed tracheal tugging were divided roughly into four classes, according to the strength of the tug, as follows: (1) *marked* tugging, 4 cases, 2 of which were diagnosed as aneurism, 1 emphysema and bronchitis, and 1 a girl with chlorosis; (2) *moderate* tugging, 17 cases, including 1 only of aneurism; (3) *slight* tugging, 20 cases, 1 of which was an aneurism, probably of the ascending aorta; (4) *very slight* tugging, 7 cases.

Tracheal tugging was found in most varied conditions of heart and arteries. In cardiac hypertrophy it was sometimes present and sometimes absent. It was found in 1 case of typhoid fever and in 1 case of delirium tremens. It was not markedly affected by the presence of renal disease. The two striking points in the analysis of cases were the absence of tracheal tugging in mitral disease, in which it was present only once, as *moderate*, out of 10 cases, and in phthisis, in which it was present once out of 5 cases,

(B-1)

and was classed as "*very slight* on excitement." In 4 cases of aortic valvular disease, it was present in 3.

In investigating the nature and cause of the tugging, several points of interest were noticed. The tugging varied in the same individual, being increased by exercise and excitement. It was much commoner in men than in women, perhaps due partly to the greater difficulty in handling the larynx in the female, owing to its smaller size. The tugging was, almost without exception, more marked during inspiration than during expiration.

Macdonnell's explanation of the cause of tracheal tugging, that the pulsation of the arch acting directly on the left bronchus depresses it, is considered quite sufficient in ordinary cases. Assuming tracheal tugging to be due to the pressure of the aorta on the bronchus, there are obviously two ways in which it may be modified: (*a*) by the amplitude of excursion of the aortic wall; (*b*) by the close approximation of the two structures involved. The first accounts for the rarity of tugging in mitral disease in which the arterial tension is low and the excursion of the aorta small. It also accounts for the general presence of tugging in aortic disease. The second accounts chiefly for its presence in aneurism, and chiefly for its absence in phthisis.

In explanation of the more marked tugging in inspiration than in expiration, it was suggested that this might be due to expansion of the aorta under the negative pressure of the thoracic cavity during inspiration. But Foster²⁰³⁶ states that the expansion of the thick-walled aorta may be disregarded. A more reasonable explanation is, that the movement of the heart downward, about an inch and a quarter during respiration, while at the same time it is pushed forward by the expansion of the portion of lung behind it, "tightens the arch of the aorta over the left bronchus during each inspiration and allows it to become lax during expiration."

The general conclusion is, that the positive value of the sign of tracheal tugging is small, it being found distinctly in 16 per cent. of all cases taken at random. As a purely negative sign tracheal tugging may be of some use. Its absence certainly denotes absence of any gross dilatation of the particular part of the vessel which we have seen to cause the sign,—the transverse arch; but it is equally certain that its presence without any corroborating evidence is so far from being diagnostic as to be of no computable value.

Ewart,² differs from Grimsdale in attaching more value to this sign of tracheal tugging. He found it to be present in 28 per cent. of the fifty-seven females examined and in 50 per cent. of sixty male subjects. "This unexpected frequency appeared to detract from the diagnostic value of the sign; but in reality a large majority of the cases were described as 'doubtful or very slight,' a few as 'moderate,' and three only as 'marked'; and these were the three cases of aneurism. In none of the females was the tugging pronounced, and in several it was present only during excitement."

Ewart raises the question of what significance is to be attached to the relatively frequent occurrence of slight tugging in healthy persons. He points out "that the left bronchus has a still closer connection with the left pulmonary artery than with the aorta, whilst the arch formed by the former vessel is much shorter and less curved than the aortic arch. Perhaps the slight tugging discovered in healthy persons may have its origin in the normal pulsation of the pulmonary artery."

Diagnosis of Aneurism of the Descending Thoracic Aorta.— J. E. Molson²² has studied the history of 10 cases of this rare disease occurring at the Middlesex Hospital during the past ten years. Post-mortem examinations were made in all. Eight of the cases were males and 2 were females. The average age was just over 44½ years. Their occupations did not point much to strains and severe work. There was no indication of lead poisoning, and only 1 case of high tension of the vessels and evidence of Bright's disease. In none of the cases was any history of syphilis given, nor were any signs of it found. Among the symptoms and physical signs that may occur, especially in an advanced stage of the disease, are diminished expansion of the left side, weaker breath-sounds, diminished vocal fremitus and vocal resonance, perhaps sonorous and sibilant rhonci, and, occasionally, increased dullness at the base of the lung.

These lung-pressure signs were noted as more or less present in 5 out of the 10 cases; but, of these, 3 showed visible pulsation and tumor. Dyspnœa and palpitation, increased by lying on the left side, were noted in 6 out of the 10 cases.

The two most trustworthy signs are cough and pain in the left side and between the shoulders. Cough is noted in 9 out of the 10 cases. Cough, continuing persistently, with a brassy ring

about it, which does not yield to remedies, for which no obvious cause can be found after careful investigation of pleura, lungs, tubes, and throat, may, perhaps, lead a careful physician to consider the possibilities of an aneurism.

Pain appears to be the most trustworthy symptom. It is mentioned prominently in the notes of all the cases except one. In the majority of cases it was described as of a dull, aching character in the chest, left side, and between the shoulders. In 3 cases it was of a sharp, paroxysmal, and anginal character. When the aneurism presses on the intercostal nerves, there is severe neuralgic pain. In a case occurring at St. Bartholomew's Hospital, persistent neuralgia of the twelfth dorsal nerve, after careful exclusion of other causes, led to the diagnosis of aneurism at the origin of the nerve, and this diagnosis was verified at the autopsy. The writer thinks that erosion of the bodies of the dorsal vertebræ occurs without pain, or with only slight, indefinite pain. In 1 case the aneurism had eroded the bodies of three of the dorsal vertebræ, and there had never been any complaint of pain. Of the 10 cases, 4 were not diagnosed until the fatal rupture or the autopsy. Out of the 6 that were diagnosed 4 had obvious superficial pulsation, and the remaining 2 had a dilated aortic arch, probably alone enabling them to be diagnosed.

The writer concludes that, with our present means of investigation, aneurism of the descending thoracic aorta cannot be diagnosed in an early stage.

In discussing this paper, Lafleur spoke of the ingenious method of diagnosing these aneurisms which had been suggested by Ferdinand Schnell.³⁴ A long stomach-tube, closed at its lower end and with a glass tube attached to its upper end, is filled with a colored liquid. The tube is introduced into the œsophagus, and if an aneurism is present it will act as a manometer, the pulsations being transmitted to the fluid in the tube. George Ross had found a left-sided pleurisy present in most of his cases, accompanied with severe pain, unlike that of ordinary pleurisy.

Duplication of Arch of Aorta with Aneurism. — At a meeting of the Johns Hopkins Hospital Medical Society,⁷⁶⁴ Oct., Nov., '03 Welch presented a specimen showing the rare condition of duplication of the transverse part of the arch of the aorta, which is caused by persistence of the descending part of the fourth right

aortic arch of the fœtus. The beginning of the posterior trunk was the seat of an aneurism about the size of a hen's egg.

Aneurism of a Right Aortic Arch.—Herringham², read, at the London Clinical Society, an account of a case in which a right aortic arch passed behind the œsophagus to the left side of the spine, and, becoming dilated, killed the patient, a man aged 39 years, by long-continued compression of the trachea. The specimen was believed to be quite unique, only twenty instances of the anatomical variety being known, none of which were described as aneurismal. Willett,² at a meeting of the London Pathological Society, showed a specimen taken from a child aged 4 years. The sac, which was about the size of a walnut, lay in the concavity of the arch of the aorta, with which it communicated by a small opening situated at the termination of the descending portion of the arch; the pathology of this sac and its possible connection with the ductus arteriosus were discussed. J. J. Clarke also showed a case, in a child aged 3 years, in which an aneurism appeared to be caused by an inflamed lymphatic gland.

"Idiopathic" Gastric Hæmorrhage from Rupture of Minute Aneurism.—Sachs, of Frankfurt,⁶⁹ reports two cases in which so-called idiopathic gastric hæmorrhage was shown to be due to the rupture of a minute aneurism in one case and of a varix in another.

Case I. A man, 79 years old, suffered from repeated, severe gastric hæmorrhage, and finally bled to death. At the autopsy the stomach was found filled with blood-clots, but the source of the hæmorrhage was not apparent. Finally, after very careful examination, a minute, thread-like clot was seen projecting from the mucous membrane of the smaller curvature. Microscopical examination showed that it protruded from the opening of a minute aneurism of a branch of the coronary artery of the stomach, which had ruptured. This aneurism would not have been discovered if it had not been for the tiny clot projecting through the mucous membrane. There was no cirrhosis of the liver. It is said that no other case of fatal hæmorrhage from the stomach caused by so minute an aneurism has been reported.

Case II. A man, 60 years of age, had had profuse hæmorrhages from the stomach for six years, at intervals of several months to a year and a half. He finally bled to death. Physical exami-

nation had shown nothing whatever besides an enlarged spleen. Post-mortem examination showed a small aneurism of the hepatic artery, which had ruptured into the portal vein and formed an "aneurismal varix"; thrombosis of the portal vein, continuing into the splenic vein and causing a greatly enlarged spleen; and, finally, a small varix at the cardiac end of the stomach, which had ruptured and caused the fatal hæmorrhage. The cause of the varix was the obstruction in the portal vein. There was neither jaundice nor ascites. No other case of rupture of an aneurism of the hepatic artery into the portal vein has been reported.

Lop, of Marseilles,¹⁰⁰ records the case of a man, aged 39 years, in whom a large aneurism of the ascending aorta had perforated the sternum and costal cartilages, and was covered only by the skin, to which it was closely adherent. The aneurism remained in this condition for three years, during which the patient was at work much of the time, and often exerted himself severely, never taking any pains to protect the aneurism. Finally, it ruptured into the pericardium. The long duration of an aneurism of this sort and its failure to rupture externally are noteworthy. Fitz⁹⁹ and Walsh²² report cases interesting from the extent of the disease and freedom from inconvenience, and the absence of characteristic symptoms of an aneurism.

Treatment of Thoracic Aneurism. — Kuwshynskij,⁸⁴ at a medical meeting in St. Petersburg, proposed a simple method of treatment, which consisted of placing a thick layer of common, moist, sculptors' clay on the chest over the aneurism and its vicinity. In this way he had treated a large aneurism of the ascending aorta, which formed a large, pulsating tumor in the right subclavicular region. After three weeks of this treatment the dyspnœa, palpitation, and severe pain in the right breast and arm had almost entirely disappeared, and the swelling had diminished one-half. In the discussion, the favorable result obtained was ascribed partly to the weight and moist warmth, and partly to the metallic constituent of the clay.

The cure of an aneurism of the descending aorta is reported by Bourget.¹⁹⁷ The aneurism showed itself as a pulsating tumor at the level of the spine of the left scapula, and was situated between the scapula and the vertebral column. A double souffle was heard over the tumor. Exploratory puncture drew off arterial

blood. A watch-spring was introduced into the sac. There was no febrile reaction. The tumor gradually flattened down. Inter-costal neuralgia, due to pressure, diminished. Four weeks after the operation exploratory puncture in the upper and lower parts of the tumor failed to draw blood. The souffle had disappeared.

Acute Perforating Ulcer of Aorta.—Thomas Oliver⁶_{Nov. 7, '91} reports the case of a watch-maker, aged 36 years, who died suddenly from perforation of the aorta just above the aortic valve. There was a small area of softening and ulceration, with gangrene, and a perforation the size of a pin's head into the pericardium. The valves were healthy, but there was evidence of an old endarteritis caused by rheumatic fever. Microscopical examination of a stained section of the ulcer showed that the tissues were filled with anthrax bacilli. The source of the infection could not be traced.

ATHEROMATOUS DISEASE OF ARTERIES.

Etiology and Diagnosis.—This subject has been carefully studied by David M'Crorie,²¹³_{Aug. Sept.} who has examined the condition of all the arteries in thirty-six cases, and of particular arteries in many other cases, in the pathological department of the Glasgow Royal Infirmary. One result of the investigation has been to convince him that atheroma is not a senile degeneration, but a preventable disease. Though, at the outset, strongly prejudiced in favor of the theory of mechanical irritation as the cause, he became convinced that the presence of an irritant in the blood was the theory which could alone explain all the circumstances of the case. Further, the probability is that neither alcoholism nor syphilis ever do supply the irritant which causes this disease,—their influence (if they exert any influence in the causation) being confined to rendering the tissues of the blood-vessels, as they undoubtedly render the tissues of other organs, less capable of resisting the onset of the disease. While it is possible that rheumatism, gout, Bright's disease, and such like may supply the irritant in some cases, it is certain that atheroma sometimes occurs independently of these diseases. What the nature of the irritant (or irritants) is it is impossible at present to say. In regard to the diagnosis of atheroma, the following is the summary of the author's conclusions:—

“1. The condition of the superficial vessels is the best guide

we have at present to the condition of the deep vessels, but this does not provide us with an infallible index. 2. Tortuosity or rigidity of the temporal, radial, brachial, or femoral points to atheromatous disease somewhere in the vascular system; but one, or all, of the deep vessels may be diseased, even extremely, and the superficial vessels be perfectly normal. 3. A tortuous or rigid temporal does not necessarily mean that the cerebral vessels are atheromatous, but it is well to presume that they are so. 4. The femoral is a truer index to the condition of the deep vessels than the radial, as it is more frequently diseased,—the disease seemingly spreading from the aorta through the iliacs to the femoral. 5. The presence of Bright's disease suggests the probability that atheroma is also present, but it may be present in the absence of renal disease. A rheumatic or gouty diathesis would suggest its possible presence, but little reliance can be placed upon the presence or absence of a syphilitic or alcoholic history. 6. A pulse of high tension, which cannot be accounted for in any other way, and the characteristic sphygmographic tracing, point to tube-like rigidity of the aorta. The arteries, however, may be atheromatous, and neither pulse nor tracing give any indication of the presence of the disease. 7. Very little guidance is afforded by the presence or absence of the arcus senilis, or the so-called 'atheromatous expression.' The presence of the former, however, would suggest the possibility of arterial degeneration. 8. In the absence of all of the above signs, the symptoms which point to defective nutrition of any organ, or organs, must be carefully considered. By a process of exclusion of other causes which might give rise to said symptoms we may arrive at an accurate diagnosis. 9. The arteries may be diseased, even extensively so, and neither signs nor symptoms indicate the presence of the disease, until rupture or other grave result proclaims unmistakably its presence."

Pathology of the Coronary Arteries.—R. B. Wild⁹⁰ has studied the condition of the coronary arteries in 112 consecutive post-mortem examinations made at the Manchester Royal Infirmary. Out of the total 112 cases, the coronary arteries were normal in 58 (51.7 per cent.) and diseased in 54 (48.8 per cent.). Excluding all cases under twenty years of age, 52 per cent. of the adults had diseased coronary arteries. The frequency of disease was about equal in the two sexes,—males, 48 per cent.; females, 48.5

per cent. Age appears to be the chief factor in determining the occurrence of atheroma, as shown by the following table:—

Age.	Total Number of Cases.	Normal Coronaries.	Diseased Coronaries.	Percentage of Diseased Coronaries.
Under 25	20	17	3	15 per cent.
25 to 35	18	13	5	27.7 "
35 to 45	35	16	19	54.3 "
45 to 55	22	8	14	63.6 "
55 to 65	18	3	10	77 "
Over 65	4	1	3	75 "

Acute endocarditis was present in 5. cases. Of chronic valvular disease, there were 16 cases. Of the latter, 9 presented normal and 7 diseased coronary arteries, the percentage being the same as amongst all the cases of the same average age. There were 49 cases of enlarged hearts, either from chronic heart, lung, or kidney disease. Of these, 22 presented normal and 27 diseased coronary arteries. The percentages in these cases agree with percentages of all cases with the same average age. We can, therefore, conclude that the presence of organic heart disease does not influence the occurrence of disease of the coronary arteries. In normal hearts with diseased coronary arteries the blood-supply to the heart was probably as good as in those with normal vessels, the larger size of the arteries in the former compensating for the diminution of their lumen by the atheroma of their walls. There was only one exception, and in this sudden death occurred. In hypertrophied hearts the coronary arteries were found not to be enlarged in proportion to the increase of cardiac muscle, and, where the arteries were diseased, they varied greatly in size in different cases. This fact probably explains the great difference of individual patients as regards their capacity for compensatory hypertrophy, a man with a large coronary artery being in a better position than one with a small artery. Regarding fatty degeneration of the heart, no conclusions could be obtained, as only one case occurred.

Of chronic Bright's disease 20 cases occurred, in 3 of which the changes were chiefly parenchymatous, in the remainder chiefly interstitial. Of these, 15 (75 per cent.) presented atheromatous coronaries, the percentage being considerably in excess of that in all cases at the same average age. It appears, there-

fore, that chronic Bright's disease is a distinct factor in causing atheroma of the coronary arteries.

Contrary to expectation, atheroma was found in only 1 of 3 cases of old syphilis. *Sudden death* occurred in 5 out of the 112 cases. In each of these an advanced degree of atheroma was present, and in 3 the coronary arteries were completely calcified. In none of the 112 cases could any history of angina be obtained. It appears, therefore, that advanced disease of the coronary arteries occurs frequently without the symptoms of angina pectoris. In patients over 45 atheroma of the coronary arteries was present in about two-thirds of all the cases, none of whom suffered from angina; the probabilities are, therefore, two to one in favor of atheroma of the coronaries being present in a patient over 45 dying from angina pectoris, quite apart from any causal relation between the two conditions.

ANGINA PECTORIS.

Angina Pectoris without Lesions of the Coronaries.—Auschner⁷ reports a case of angina in which death occurred during a paroxysm. Aortic and mitral endocarditis was found post-mortem, but no lesion whatever of the coronaries. The writer had made numerous autopsies on the bodies of old people, at the Bicêtre Hospital, where there had been no complaint of angina during life, and yet the coronaries were found to be almost occluded by atheromatous plaques. Pilliet confirmed these observations. He had found a large number of obstructed coronary arteries which had never caused angina.

Tison⁷ reports two cases in which the coronary arteries were atheromatous, calcified, and rigid, and showed great narrowing of lumen; in one case, indeed, they were scarcely permeable. In neither instance had there ever been an attack of angina pectoris.

Pathology.—Peter³ makes a distinction between angina caused by neuralgia and that caused by neuritis of the cardiac plexus. As an illustration of the latter, he mentions two cases in which the anatomical examination showed aortitis and adhesions of the visceral and parietal pericardium to the external coat of the aorta. The cardiac plexus was enveloped in newly-formed fibrous tissue, and was much injected. Microscopically, the nerve-fibres showed their axis-cylinders broken or absent in places and the

myelin degenerated. The aortitis had been succeeded by peri-aortitis and peri-neuritis. The alteration of the nerves was manifested by angina pectoris, which proved fatal. On the other hand, clinical experience shows that, in certain cases, there is a simple neuralgia of the cardiac plexus, as in the angina pectoris occurring in acute rheumatism, in nicotine intoxication, hysteria, and *la grippe*. The neuralgic form of angina is, ordinarily, not of grave prognosis; the form associated with neuritis, on the contrary, is a common cause of sudden death. The writer has drawn an analogous distinction between two varieties of aortic insufficiency; the one is of arterial origin (atheromatous), the other of endocardial or rheumatic origin. The first may cause sudden death, because it is complicated with angina pectoris; the other, of rheumatic origin, never causes aortitis or angina pectoris, and is not incompatible with long life. The neuralgic form of angina may be recognized by the integrity of the aorta, absence of aortic dilatation, by the fact that the pain is not permanent, and, finally, by a knowledge of its causes.

The old theory, recently revived, that angina pectoris is caused by a lesion of the coronary arteries producing stenosis, or, in the absence of a lesion, by spasm of the coronaries, rests on an error of observation and an error of interpretation. It is usual, in making autopsies, to examine the coronary arteries alone, and to forget that coronary arteritis is only a part of a general arteritis; so that no search is made to discover aortitis, and especially peri-aortitis. The writer refers to a case in which the coronary artery was diseased and filled with a thrombus, without having caused angina pectoris. He also refers to the cases reported above by Auscher and Pilliet, in which marked coronary obstruction was not accompanied by angina pectoris. Peter explains the occurrence of angina in one of Auscher's cases as being caused by neuritis, consequent on adhesive pericarditis, which was present. The pericardium envelops the base of the aorta, and is in intimate relation with the cardiac plexus. Pericarditis may, therefore, occasion a neuritis of the cardiac plexus. Cardiac neuritis is generally consecutive, however, to aortitis.

Treatment.—In the benignant or neuralgic form Peter recommends the treatment usually employed in cases of neuralgia, especially directed to the cause of the neuralgia. In the dangerous

form of angina, associated with neuritis, treatment must be energetic, and if not radically curative it can, at least, much ameliorate the condition. During the painful paroxysms he relies on injections of muriate of morphine, which he has found much superior to nitro-glycerin. The essential treatment, however, is to combat the peri-neuritis and peri-aortitis with iodide of potash, and especially with revulsion, which sometimes gives surprising results. Vesication is produced by the actual cautery in the pre-aortic region, or, if this is not sufficient, by Vienna paste. The cautery is applied in the third intercostal space at the left border of the sternum, and sometimes, also, in the third intercostal space at the right. Suppuration is kept up for a considerable time. Remarkable results are thus produced.

CARDIAC NEURITIS AND NEUROSIS.

Lancereaux ¹⁴_{July 27, 31} discusses the pathology and symptoms of the above conditions. Inflammations of the cardiac nerves, particularly of the pneumogastric, occur as interstitial or parenchymatous neuritis. Each of these forms produces different results.

I. *Interstitial neuritis* produces slow pulse, liability to syncope, and angina pectoris. This affection is almost always secondary, and may involve the pneumogastric nerve or the cardiac plexus. Its causes, in the former case, are the different kinds of tumors which are found along the course of the nerve-trunk and compress and inflame it. Such are certain bulbar lesions, carotid or aortic aneurisms, alterations of the lymphatic glands, and new growths, lesions of the thyroid, etc. The compressed nerve-trunk sometimes atrophies, but more often it swells and becomes indurated, in consequence of the multiplication of the elements of the perineurium. This thickening of the connective-tissue stroma compresses and irritates the nerve-fibres, which afterward degenerate.

Similar modifications are found in the cardiac plexus when the first portion of the aorta becomes inflamed, especially if the pathological process begins in the external coat of the vessel. The ramifications of the cardiac plexus surrounded by the inflamed tissue become injected, while their connective-tissue elements multiply, irritate, and compress the nerve-fibres. Associated with these disorders are functional troubles, which vary according as the pneumogastric trunk or the cardiac plexus is affected. In the

case of the pneumogastric it matters little what part of the nerve is involved. The symptoms resemble the results obtained by experimental excitation of the pneumogastric; they are usually intermittent, and consist of slowing of the pulse, syncopal or epileptiform attacks, associated with sensations of angina, general malaise, and oppression. The pulse falls to 40 or lower. The rhythm is generally preserved, but in some cases it is irregular or double. Reflex nervous disturbances may cause the same symptoms that are present in pneumogastric neuritis. Thus, a certain number of dyspeptics have a slow pulse, and even attacks of syncope. These symptoms generally disappear after several hours, but in some cases they have been followed* by sudden death, caused by arrest of the heart.

When the cardiac plexus is specially affected, true angina pectoris results. These attacks of angina differ from those which are produced by arteriosclerosis involving stenosis of the coronaries. In the latter case the attacks generally come on in consequence of fatigue, as after marching, mounting stairs, etc. In the neuritis of the cardiac plexus resulting from aortitis the attacks generally come on during repose, or more often an hour or two after a meal.

Dyspnœa is the predominant feature in the arteriosclerotic type, but severe, agonizing pain in neuritis of the cardiac plexus. Moreover, in the latter the pain radiates toward the neck, the head, and especially the arm, and is sometimes accompanied by vomiting and epileptiform attacks; while in arteriosclerosis the pain is circumscribed in the thorax or extends toward the shoulder, and is not followed by secretory disturbances and involuntary emission of urine, as when the cardiac plexus is involved.

Neuritis of the cardiac plexus is not the only cause of angina. Certain toxic effects, as of tobacco, are localized in this plexus, and any nerve-reflex may affect the cardiac fibres and cause symptoms similar to those of neuritis. This form of angina is not as painful as in actual disease of the plexus, and death is exceptional. If caused by digestive disturbances, the attacks cease when these disturbances have disappeared.

Treatment varies according as the attacks are due to neuritis or are simply reflex. In the former case iodide of potash is certainly the best means of opposing the connective-tissue formation which compresses the nerve-fibres. In the latter case we must

prevent reflex excitation of the pneumogastric by remedying the digestive disturbances, and at the same time diminish excitability of the nerves by the use of bromide of potash in large doses, by morphine, and by chloral.

II. *Parenchymatous neuritis* produces tachycardia. Parenchymatous neuritis of the pneumogastric is generally of a toxic or infectious origin. Among toxic causes are abuse of alcoholic drinks—especially those containing essences, as absinthe—and arsenical poisoning. Paralysis of the extremities may also be found to co-exist. Cases of infectious origin are found among convalescents from diphtheria, typhoid fever, and other acute infectious diseases. The anatomical changes are localized in the nerve-fibres, which show segmentation of the medullary sheath. This becomes granular and is finally absorbed. The axis-cylinder is rarely altered. Lancereaux has observed this granular condition of the myelin of the pneumogastric fibres in the cases of two young women who died of absinthe poisoning, the paralysis beginning in the lower limbs. In another case these changes were found in a man on whose breast a diphtheritic false membrane had followed the application of blisters.

The symptoms are paralytic, and resemble those produced by section of the pneumogastric. The pulse rises rapidly to 120, 160, or more, a minute, while respiration remains normal or becomes slower. Digestion becomes disturbed through failure of the gastric secretion. Finally, the respiration becomes embarrassed, pneumonia sometimes occurs, and death may follow, as in animals whose pneumogastric has been cut. Tachycardia may not be caused by inflammation of the pneumogastric in all cases, but is sometimes of reflex origin. The causes are various, and sometimes difficult to determine: excessive nervous excitability, as in hysteria, together with physical fatigue or immorality, onanism, venereal excess, high temperature, and perhaps the abuse of tea and coffee. The mechanism of tachycardia may consist in paralysis of the pneumogastric or in excitation of the accelerator. The former best explains intermittent tachycardia, but the latter is more probable in cases of goitre.

The treatment in case of a neurosis causing tachycardia consists in the use of chloral, bromide, morphine, and hydrotherapy, means which diminish reflex excitability. If there is a lesion of

the nerve-fibre, electricity and hydrotherapy are more particularly indicated. Digitalis, in such cases, must be used with great caution, as its action is sometimes contrary to what is desired.

Thomson² reports three cases of neuralgia of the heart following influenza. The patients were all in good circumstances, and in no case was there evidence of an organic cardiac lesion. There was a sudden, fatal termination in one case, a gentleman aged 39. His father died of angina pectoris at the age of 61. The neuralgic attacks came on during or soon after the occurrence of influenza. The bulb was undoubtedly attacked in all cases; in the first case the acute vomiting, and in the second the pain commencing in the epigastrium, point to the gastric fibres of the vagus being affected, while the local tenderness of the last case might suggest involvement of the cardiac plexus.

PERICARDITIS.

Etiology.—Fabre⁵⁵ gives a *résumé* of researches recently made by Rubini, of Naples. Five series of experiments were made on rabbits with pure cultures of the staphylococcus aureus and albus to determine: 1. Whether the simple intra-venous injection of the pure cultures produce pericarditis (12 experiments; negative). 2. Whether the direct injection of staphylococci into the pericardium produces pericarditis (14 experiments; positive). 3. Whether, after an irritation of the pericardium, the intra-venous injection of staphylococci is followed by pericarditis (25 experiments; positive). 4. Whether the application of cold to the præcordial region can of itself provoke pericarditis, and, in case of negative result, to determine what influence this application of cold would have upon the localization in the pericardium of staphylococci injected into the blood, and upon the consecutive development of pericarditis (17 experiments; in 9 cases out of 12 the injection of staphylococci, preceded by the application of cold to the pericardium, produced pericarditis). 5. Whether injuries to the præcordial region or to the heart exercise any influence in the production of pericarditis (simple præcordial contusion will not produce pericarditis; but, after contusion, the injection of staphylococcus albus into the blood of 12 rabbits produced pericarditis in 5 cases, while the injection of staphylococcus aureus in 12 other cases was negative).

VALVULAR DISEASE.

J. A. Lindsay⁶ presents an analysis of 50 cases of valvular disease occurring in his practice within the last few years. In these cases it was found that pure mitral regurgitation was much the commonest; that next in order followed aortic lesions combined with mitral regurgitation; that pure obstruction, either at the mitral or aortic orifice, was a somewhat rare condition. The average age of 33 patients with pure mitral disease was found to be 29, while the average age of 14 patients in whom the aortic valves were affected, either with or without mitral disease, was found to be 41. This decided contrast is explained by the fact that mitral lesions are usually the result of endocarditis, while aortic lesions are often the consequence of atheroma or other degenerative changes of the walls of the arteries. Of the 50 cases, 26 were males and 24 females, showing that sex has little influence in predisposing to valvular lesion of the heart. In 27 out of the 50 cases there was a clear rheumatic history, showing that this is by far the most potent factor in the causation of valvular lesions. Next follow, but at a great distance, drink, syphilis, and renal disease. The records in these cases show that the heart often withstands the first attack of rheumatism, sometimes the second, but that it inevitably gives way when there is a series of such attacks. As regards *prognosis*, pure aortic obstruction is the least serious, pure aortic regurgitation the most serious, and affections of the mitral valve intermediate. Although opinions differ, the writer is inclined to believe that the prognosis is somewhat more favorable in mitral obstruction than in mitral regurgitation. He points out, however, that, as the majority of cases of mitral obstruction are found either in children or women, whereas mitral regurgitation is common in both sexes and at all ages, the comparison is hardly a fair or an instructive one.

Heart Disease in Children.—Crandall⁵¹ reports 135 cases of acquired cardiac disease in children under 14 years of age. Of these, 38 per cent. were boys and 60 per cent. were girls. Of 74 cases, a family history of rheumatism was obtained in 53 and no history of rheumatism in 21. Of 117 children, 86 had suffered from rheumatism at time of first visit and 31 had not. Of the latter, rheumatism appeared in 8 cases while under observation. A history of chorea was obtained in 41 cases, of which 33 were

distinctly rheumatic. The writer is strongly inclined to believe that the endocarditis of chorea is, in fact, rheumatic, though in 8 cases of chorea no history of rheumatism could be obtained.

By far the most common symptoms were dyspnoea and palpitation. The following murmurs were heard:—

Mitral regurgitation,	in 124 cases, alone in 93 cases.
Mitral obstruction,	" 16 " " " 4 "
Aortic regurgitation,	" 9 " " " 0 "
Aortic obstruction,	" 26 " " " 8 "
Double mitral and double aortic,	in 2 "
Mitral regurgitation and double aortic,	" 8 "
Mitral regurgitation and aortic obstruction,	" 18 "
Double aortic (alone),	" 1 "

In 4 cases murmurs were heard, but were not differentiated.

Mid-Systolic and Late-Systolic Mitral Murmurs.—Griffith⁵ describes the occurrence of these murmurs in three cases observed by him. By mid-systolic and late-systolic murmurs are meant "those which possess the area of diffusion of the ordinary murmur of mitral insufficiency, and which are attended by the ordinary symptoms of the disease, but which occupy only the middle or latter portion of the period between the apex-beat of the heart and the second sound, leaving the first portion unaffected." This form of murmur is very unusual. The method of production of mid- and late-systolic murmurs admits of different explanations. If the murmur be at the aortic valve, an obstructive lesion of the aorta must be presupposed. If basic, it may be a hæmic murmur, of which the mode of production is not understood. If it be at the apex, and with the diffusion of a mitral regurgitant murmur, the existence of mitral insufficiency may reasonably be assumed. The regurgitation in some such cases might depend on no actual valvular lesion. Relaxation of the walls of the ventricle, or of the papillary muscles, might allow of some slight regurgitation during a portion of the systolic period. It seems much more probable, however, in these cases, that the mitral regurgitation is of a much greater degree than the murmur alone could indicate. The regurgitation in the cases reported probably lasted through all, or nearly all, of the systolic period, but usually became audible, for unknown reasons, only toward the middle or latter portion of it.

Difference between the Radials as a Sign of Mitral Stenosis.—Popoff²¹ has frequently been able to demonstrate a difference

between the pulsations of the radials in cases of mitral stenosis in the stage of failure of compensation. The pulse was much weaker in the left radial than in the right, and at times was hardly perceptible in the former. As the heart's action improves, the difference becomes gradually less marked. Post-mortem examinations showed no special cause for the difference. Popoff explains the difference as being caused by the pressure of the greatly dilated and hypertrophied left auricle against the portion of the aorta from which the left subclavian artery arises. Again, the greater length of the left radial, and the more acute angle which the left subclavian makes with the aorta, as compared with that made by the right subclavian with the innominate, probably has some influence. The difference in the pulse is more marked in young men than in elderly people, as in the latter the heart, owing to the loss of elasticity and consequent elongation of the great vessels, lies lower, and, therefore, farther away from the arch of the aorta. Popoff ascribes to this sign great diagnostic importance.

Incompetence of the Pulmonary Valves.—This subject was introduced at the recent Medical Congress at Leipzig by Gerhardt, of Berlin. ¹⁵ Since the time of Skoda it has been looked upon as the most rare of all the valvular affections. Gerhardt collected twenty-nine cases established anatomically, and of these only one-fifth can be put down to acute rheumatism, the remainder to other causes, such as puerperal fever, injury, gonorrhœa, and syphilis. Congenital anomalies are frequent. The thin segments of the pulmonary valves are easily destroyed, and not infrequently absence or perforation may be observed. Pure cases are very rare; affections of the other valves usually being present, those of the aortic most commonly. Sometimes the insufficiency is relative, from dilatation of the pulmonary artery. It occurs at all ages, in children as well as in adults. The diastolic bruit is heard at the left sternal border, is more marked with expiration, and has a deeper note than the murmur of aortic regurgitation. Embolic processes in the lungs, as also hæmorrhagic infarcts, are points of distinction. The incompetency may lead to changes in the pulmonary arteries similar to those in the systemic vessels in aortic disease, such as dilatation and tortuosity.

MYOCARDIAL DISEASE.

Large Tubercle of the Heart.—Noel ⁷_{May 27} reports the case of a man aged 42 who died suddenly. A tumor measuring seven centimetres in length and twenty-five millimetres in thickness was found in the anterior part of the wall of the right auricle. Microscopical examination showed tubercular elements, with numerous giant-cells. The tumor had developed in muscular tissue, the pericardium being entirely normal. No evidence of tuberculosis was found in any of the other organs.

Syphilis of the Heart.—Semmola, of Naples, ³_{Aug.} had this subject called to his attention in 1883, when he cured a case of severe cardiac disease, with failure of compensation, by sublimate injections and large doses of iodide of sodium. All other treatment had proved useless. Since that time he has treated a large number of cases, varying in gravity from the most severe attacks to simple arrhythmia, and he always employs specific treatment whenever there is a suspicion of syphilis in the history of the patient. From his study of twenty-seven cases, he has come to the conclusion that when an old syphilitic case presents a continuous and persistent arrhythmia, which is rebellious to all the hygienic and pharmaceutical methods of regulating the heart, the physician should suspect a syphilitic process and should employ specific treatment, although there may not be a single visible symptom of constitutional syphilis.

Aneurism of the Heart.—Kundrat ⁵⁷_{Feb. 21} divides cardiac aneurisms into two forms,—chronic and acute. The chronic are usually found projecting from the apex of the left ventricle, may reach the size of a hen's egg, contain thrombi, and show a thickened endocardium. These aneurisms arise by the perforation of a portion of the heart-wall by an ulcer, destruction of the muscular tissue, and the substitution of fibrous tissue; this being unable to withstand the blood-pressure, is pouched out. This process is not dependent on myocarditis, but may originate in simple atrophy, fatty degeneration, or myomalacia. If the coronary arteries be narrowed by endarteritis, it is evident that the aneurism will occur at the apex, this being the most distant portion of the arterial circuit. Endarteritis and syphilitic myocarditis are further causes of these aneurisms.

Section of an acute aneurism shows that the outer portion of the heart-wall alone, and not the whole thickness, forms the pro-

trusion, while the inner portion of the wall is infiltrated with blood. This process is the result of an endocarditis. These aneurisms are usually fatal. Endocarditis is the most important, but not the only course, myomalacia resulting from embolism sometimes causing aneurism.

Kundrat showed a greatly enlarged heart, with three aneurisms, which had been caused by the perforation of myocarditic abscesses, and communicated with the left ventricle by small openings.

Mackenzie and Williamson⁹⁰ report a case of aneurism of the posterior wall of the left ventricle which ruptured into the pericardium, causing sudden death. The aneurism formed a rounded pouch about the size of a marble, and its wall was composed simply of the endo- and peri-cardial layers, the muscular tissue having disappeared. The rupture was through a minute linear opening one-eighth inch in length. The aneurism was thought to be caused by myomalacia resulting from an obstructed coronary artery. The patient, aged 58 years, had suffered from symptoms of angina pectoris for three months.

WOUNDS OF THE HEART AND PERICARDIUM.

Lumniczer⁴¹_{708.12} reports five cases of wounds of the heart observed by him: 1. A woman attempted suicide by stabbing herself in the left breast. Two hours later succussion-sounds were heard with the contractions of the heart and no cardiac dullness could be made out. The next day friction-sounds were heard. The wound was united by sutures, and on the eighth day the area of cardiac dullness and the auscultatory sounds were normal. 2. Injury to pericardium by a fractured rib, followed by pneumo-pericardium and pericarditis. On the eleventh day the heart appeared normal. 3. Shot wound of heart and pericardium. Emphysema and bloody sputum showed an injury of the lung; tympany over the cardiac area and succussion were the signs of pericardial injury. From the position of the wound and the cyanosis and profuse bleeding, it was evident that the heart was injured. After two days signs of pericarditis appeared, and on the sixth day disappeared. In two weeks the patient was well. 4. The result of a shot wound. Two hours after the injury there was increase of cardiac dullness and the

pulse was weak and slow. The pericardium was evidently filled with blood and air, and there was blood in the left pleural cavity. The blood in the pericardium hindered the contraction of the heart. Cyanosis, dyspnoea, and feeble heart-sounds were also noted. In three days the præcordial dullness diminished and the pulse became stronger, cyanosis and dyspnoea disappeared, and recovery rapidly took place. 5. A stab wound. Four hours after the injury examination showed that air entered the chest with inspiration, and there was dullness about the fifth and sixth ribs. Splashing sounds were heard over the heart. On the next day fluid blood flowed from the wound; cyanosis; pulse, 140; respiration, 58; apex could not be felt. On the second day the heart-sounds could scarcely be heard. To relieve the heart from the pressure of blood in the pericardium, the writer enlarged the wound, resecting a portion of the sixth rib. It was determined by the finger that the pericardial wound was two centimetres long, and that in the anterior wall of the ventricle was a wound two centimetres long and three millimetres deep. After evacuation of the blood-clots the pericardial wound was closed with catgut. Cyanosis disappeared at once and the pulse improved. Improvement continued until the fourteenth day, when pleurisy appeared. Four days later the patient died of exhaustion. The autopsy confirmed the diagnosis.

Conclusions: 1. The diagnosis of wounds of the heart may be made by means of local and general symptoms, of which the most important is that of compression of the heart. 2. The signs of injury in many cases appear only after a considerable time, and the condition cannot be diagnosed at once. 3. The signs consist of increase of the area of cardiac dullness, splashing sounds synchronous with the heart-beats, in weakness and arrhythmia of the pulse. 4. If there is evident compression of the heart, surgical interference is justifiable, and the effused blood should immediately be evacuated.

Joseph Coats²¹³_{Proc. W.} showed, at the Pathological and Clinical Society, the heart of a girl, aged 10 years, who fell upon a spike of an iron railing. The chest was penetrated on the right side, about the level of the fourth rib, at its junction with the cartilage. The patient recovered from the shock, and appeared to be doing well for eight days, when she suddenly became delirious and feverish,

and sank rapidly. At the post-mortem examination a wound was found penetrating the pericardium, and measuring three-fourths of an inch in length by less than a fourth of an inch in breadth. This aperture was entirely closed by fibrin. Opposite the wound in the pericardium the right auricle presented a wound of similar size, also closed by fibrin, except at its upper extremity, where there was an aperture sufficient to admit the point of a small probe. Viewed internally, this wound was represented chiefly by a layer of warty vegetations, resembling those of malignant endocarditis. The pericardium contained a very large quantity of blood-colored fluid, which, especially in the lower part, was muddy and almost purulent. In this fluid abundant streptococci were found. It appears, in this case, that a considerable escape of blood into the pericardium occurred at the time of the injury; but yet the patient survived, and the wound became closed with fibrin. Secondly, the streptococci introduced by the spike set up a septic pericarditis, and this probably re-opened the wound in the heart. The immediate cause of death was probably distension of the pericardium.

MISCELLANEOUS.

Diagnostic Value of Atropine in Bradycardia.—Dehio, of Dorpat, ²¹_{Jan.} proposes the use of atropine to distinguish cases of bradycardia due to irritation of the vagus system from those depending upon a lesion of the automatic motor apparatus of the heart itself. As this alkaloid paralyzes the endings of the vagus nerve in the heart, in those cases of bradycardia which depend on irritation of the bulbar vagus centre, or of the terminations of the nerve in the heart, a subcutaneous injection of atropine will make the bradycardia disappear. The writer reports a case in which a pulse-rate of 48 was increased to 144 by atropine. In a man aged 74 years, with cardiac dilatation and a pulse-rate of 28, atropine raised the pulse for a short time to 33. In a case of general arteriosclerosis a pulse of 40 was raised only 5 beats. The lesions which have been found in bradycardia of cardiac origin are fatty degeneration of the heart-muscle, which is the most common, and sclerosis of the coronary arteries, resulting in fibrous myocarditis and thrombotic myomalacia. In cases associated with valvular disease, aortic stenosis and mitral stenosis are most common. When by atropine we can exclude any extra-cardiac cause of

bradycardia, the increased rate of cardiac pulsation caused by the atropine injection will give us a direct measure of the energy of the automatic cardiac motor centres. Atropine increases the rapidity of the pulse much more in young than in old persons. Generally the pulse reaches its greatest rapidity in twenty to thirty minutes after the injection of atropine.

Edes⁸⁰_{Nov., '91} reports the results of an autopsy which he made in the case of a man aged 53 years, who, for over two years, had a pulse ranging from 11 to 40 beats per minute, attended with fainting spells, and finally with delirium. The heart was rather large and firm. Neither the aorta nor the coronary arteries were atheromatous. Brain, spinal cord, cervical ganglia of the sympathetic, a portion of the thoracic sympathetic, and a portion of the splanchnic,—all appeared normal. On dissection of the heart, the left pneumogastric appeared normal until the region was reached where it bends under the arch of the aorta to give off the recurrent laryngeal. Here several of the strands appeared somewhat less clearly defined through the surrounding connective tissue, which at this point was more strongly adherent. There were fusiform enlargements of the several cords. One of these was on a cord going downward to form the œsophageal plexus. Others were on the bend of the recurrent laryngeal, just below the artery. At this point the recurrent laryngeal gives off branches which connect with the cardiac plexuses. The muscular substance of the heart was firm and not fatty.

Opitz¹⁵⁰_{Apr.} records two cases of slow pulse for which no explanation could be found: 1. A strong, middle-aged workman came under treatment for pneumonia. At the height of the attack the pulse was only 60, and during convalescence it fell to 40. It did not rise above the latter figure when the man resumed his laborious occupation. 2. A woman of 78 years, in good condition for her years, had a pulse of 28 to 30 for three months. She then had gastric catarrh, and the pulse sank to 20. She then complained of dizziness and headache, though the radial pulse was full and strong. There was no increase of cardiac dullness, and the sounds were distinct and regular. Six months later the pulse rose to 80, and there remained.

Sendler³¹⁹_{Aug. 6 ; Sept. 10}² records the following case, with the result of the autopsy: A woman aged 35 had suffered for six months

from general debility, with attacks of fainting. The heart was beating only 40 times a minute. The apex-beat could hardly be felt. The cardiac dullness was much increased, and a loud systolic murmur was heard in the aortic and pulmonary areas. After an attack of fainting the pulse fell rapidly to 35, and then more gradually to 22. Faradization of the vagus alone increased the rate at all permanently. She died in a fainting-fit. At the autopsy the heart was found to be greatly enlarged in all directions and covered with much fat. The muscular substance of the right side was considerably hypertrophied, but flabby, and the right ventricle and auricle were much dilated. The valves themselves were unaffected; but, one centimetre below the opening of the pulmonary artery, there was a hard fibroma, of the size of a walnut, producing stenosis of this orifice.

Tachycardia.—Hempeln⁶⁹ reports a case which ended in recovery after a period of fifteen years, and in which the habitual form of the disease was accompanied by paroxysmal exacerbations. A man aged 47 had acute rheumatism fifteen years before, complicated by a fibrino-serous pericarditis. In the fifth week of the disease the pulse rose to 152, and during the next two weeks it varied between 140 and 160. Notwithstanding this, the patient improved and left his bed in the eighth week, the pulse being 140 to 148, at which rate it continued about a year, without causing any inconvenience. During the next twelve years it continued at 120. In 1886 there were superadded paroxysmal attacks of two distinct kinds, namely: (1) palpitation; (2) a paroxysm of greatly-increased tachycardia. The first was brought on by exertion, and was characterized by violent and rapid cardiac action, which continued for several seconds or minutes and occurred almost daily. The second kind of paroxysm often came without apparent cause. This attack began by lessening of the frequency of the pulse, then a feeling of oppression, and the pulse-rate amounted to 240, or even 280, per minute. There was great anxiety, as well as nausea and sweating. The attack lasted two, four, six, or even eight and one-half hours. These attacks repeated themselves each year. In 1891 he had an attack of palpitation lasting fifteen minutes, and followed by a feeling of suffocation and great weakness. This continued during eight days, when the heart's action became so violent and irregular that the patient

thought he was about to die. He fell into a sleep and woke up with a pulse of 88. From this time the tachycardia entirely disappeared. The author does not think that the habitual tachycardia was a cardiac neurosis. It was not due to paralysis of the vagus or irritation of the sympathetic, on account of the long duration and ultimate recovery. Hempeln is of the opinion that it was brought about by the pericardial adhesions and that it was a compensatory measure. He would, however, attribute the paroxysms to a neurosis, and would explain the recovery by the adhesions being broken down in the last violent attack of tachycardia.

Position in Cardiac Auscultation.—Azoulay, of Paris, ^{17, 26} June 11; ²⁶ Sept. recognizing the influence of the horizontal position in increasing vascular tension and intra-cardiac blood-pressure, as shown by Marey, suggests a modification of this position by which these effects on the heart become still more marked. The object is to make the cardiac region occupy the lowest possible position in relation to the rest of the body. The heart being in the lowest position, all the venous blood returns to it quickly, and the left ventricle has to overcome a considerable resistance in order to send the blood to the extremities. The tension at the cardiac level is very great, and the organ beats very slowly and with much more force. The normal sounds increase in intensity and, if any abnormal sounds exist, they become more marked. The following is the position recommended: (1) make the patient lie as horizontally as possible; (2) take away all pillows, and only leave a bolster, which should raise the head alone, without the shoulders, so that the chin rests on the chest; (3) raise the arms perpendicularly to the bed, or it may be sufficient to let them rest easily over the head; (4) bend up the lower limbs, so that the heels are in contact with the buttocks, the soles of the feet being flat on the bed. If there should be any necessity, the buttocks can be raised by one or two pillows, or an assistant can seize the heels, extend the legs, and raise them to an angle of 40 or 50 degrees above the head.

This position re-inforces the heart-sounds sufficiently for a bruit, however slight it may be, to be heard distinctly. The murmurs, while becoming clearer, lose their roughness and tendency to propagation in all directions. In pericarditis, also, this position

makes it easy to detect the double rubbing sound with ease, even where the sound in the ordinary position has been lost for several days. The increased vascular tension might make this method dangerous in the case of aneurisms, ulcerative endocarditis, fatty degeneration, in atheromatous old people, in asystolism, or in cases of marked dyspnoea from cardiac or pulmonary disorders.

In addition to the gain on the part of auscultation, inspection and palpation are benefited by the new position. The examination of the arteries, veins, and capillaries is facilitated. In tricuspid incompetency the jugular pulsation and the pulsation of the liver will be easily observed.

O. B. Campbell,⁶¹ also comes to the conclusion that nearly all murmurs are louder when the patient is recumbent than when he is standing or sitting. He presents statistics of 100 consecutive examinations of soldiers in Michigan, which are as follow: Total number in which murmurs increased during dorsal decubitus, 78; murmurs not affected by changing position of body, 12; murmurs not perceptible in standing, but developed on lying down, 4; murmurs more developed in upright than in recumbent position, 6.

Intra-thoracic Auscultation.—At a meeting of the Medical Society of London, Richardson⁵⁹ described a novel method of intra-thoracic auscultation. While passing a soft-rubber tube in a case of suspected œsophageal stricture, it occurred to him to attach the end of the tube to his stethoscope. The results were interesting and satisfactory. On withdrawing the tube until the opening of the tube came in contact with that portion of the œsophagus which lay in immediate contact with the heart, he was able to hear both sounds as distinctly as those from a normal heart, though, on previous ordinary auscultation of the same case, he had failed to clearly detect the cardiac sounds, owing to the heart's action being very feeble. The sounds were both loud and distinct. By moving the tube gently up and down, he could get the second sound separately from the first, and *vice versâ*. The respiratory murmur could not be heard as distinctly as from the chest-wall outside. The writer suggested that by this method the diagnosis of clot on the right side of the heart might be made clear, and the differential diagnosis of right or left valvular disease ought to be rendered absolute. A clear distinction should be obtained between pericardial and endocardial sounds, and between pericardial and pleural

friction. Aneurismal pressure on the œsophagus would be instantly diagnosed, as we should hear the pulsation at the stricture.

Hypertrophy of the Heart in Pregnancy.—The assertion has been made by various writers that hypertrophy of the heart takes place during pregnancy. An attempt has recently been made to place the statement on a firmer basis. Max Dreysel⁴¹_{Feb. 18} has, under the direction of Ballinger, examined all reports of autopsies on women who have died in labor or childbed in the Munich Hospital during the years 1879–91. All such cases as presented acute or chronic alteration of organs that might lead to cardiac changes were rejected. The heart was measured in seventy-six cases and weighed in fifty-seven, and the conclusions reached were as follow: (1) in both pregnant and lying-in women slight eccentric hypertrophy of both ventricles is the rule, the increase in bulk of the left ventricle exceeding that of the right; (2) the increase in the size of the heart is proportional to the increase of the body of the mother; (3) the hypertrophy is specially marked in young, well-nourished, strong people; (4) the hypertrophy progresses with the duration of the pregnancy, reaches its maximum at the close, diminishes in childbed, at first rapidly and later more slowly; (5) with the expulsion of the uterine contents the mass of both ventricles diminishes, and with the commencement of lactation a sudden diminution again takes place. The author considers the hypertrophy to be due to inclusion of the placental circulation and the increase in the quantity of blood, as hypertrophy and enlargement of the right ventricle can only be explained by increased fullness of blood.

Musical Heart-Murmurs and the Chordæ Tendineæ.—At a recent meeting of the New York Pathological Society, H. S. Stearns¹⁵¹_{Sept.} presented a specimen showing the chordæ tendineæ stretched across the left ventricle. The specimen had been removed from a man who, during life, had had a musical systolic murmur at the base of the heart and transmitted into the vessels of the neck, and also a diastolic murmur, heard only at the base. J. M. Byron said that he had seen two similar cases, in which the condition had been diagnosticated during life by the musical sound produced during the systole of the heart.

Congenital Malformation of the Heart and Pulmonary Tuberculosis.—W. Moore reports three cases of malformation in which

there was stenosis of the pulmonary artery. In each case tubercular nodules were found in the lungs. The writer points out the almost universal development in these cases, if the patient lives long enough, of pulmonary tuberculosis. So far as the heart itself is concerned, it appears, from these and from many other recorded cases, to be able to do its work fairly well, even for as long as other hearts; only, for some reason, the lungs are found to be more vulnerable in these subjects, and death is directly due to disease in these organs, and not in the heart. In these cases the lungs receive a very small supply of blood,—they are dry; and it is in this dry tissue, poorly supplied with blood, that the tubercle bacillus finds a suitable soil for its development. On the other hand, in patients suffering from valvular lesions of the left side of the heart, there is the usual amount of blood driven to the heart, but it cannot escape readily; consequently, there is more blood in the lungs than normal,—they are wet,—and in such lungs the occurrence of tubercle is almost unknown. It has further been stated that, if the pulmonary artery is examined in all cases of pulmonary phthisis, it will be found to be smaller than normal.

Mitral Stenosis and Pulmonary Tuberculosis.—Potain⁵ reports a case of mitral stenosis in which the autopsy showed the scars of an old tubercular process at the apices of the lungs, and cheesy bronchial glands. He has collected reports of fifteen cases in which pulmonary tuberculosis was found associated with mitral disease. He once had a tubercular patient who had reached the period of cavity formation, and in whom the pulmonary lesions gradually cicatrized on the development of a mitral stenosis. Yet this is not the usual course of the disease, the mitral stenosis appearing to facilitate the development of tuberculosis. In explanation of this difference, Potain points out that the congenital forms of stenosis favor tuberculosis, while rheumatic and other varieties of mitral disease usually exclude it. Certain authors, Teissier in particular, have thought that tuberculosis could itself determine an endocarditis.

Absence of Orthopnoea in Fatal Cardiac Dilatation.—Handford⁶ reports four cases of fatal cardiac dilatation, involving especially the right side of the heart, in which orthopnoea was never present. It has been suggested by the late Hilton Fagge that the absence of orthopnoea is characteristic of right-sided affections, but

no satisfactory explanation of this fact has been given. It would appear that the upright position gives relief chiefly in failing compensation in valvular disease and in the failing heart of renal disease, but that in dilatation, especially when the right side is affected, and in degenerations of the cardiac muscle, as in anæmia, after fevers, diphtheria, and septic poisoning, the tendency to faintness produced by the upright position more than counterbalances any other advantages.

Unsuspected Heart Disease.—Vickery⁹⁹ reports twelve cases in which, for a considerable time, there had been organic heart disease, and yet the patients had been entirely unconscious of the fact. Some of them, indeed, did not have symptoms suggesting heart disease to a physician. These observations emphasize the necessity of thoroughness in the physical examination of every patient, so far as practical. In such cases the earlier the discovery of cardiac disease is made by the physician and communicated to the patient, the better. “A sensible patient, properly advised as to his physical limitations, may be able to lead a long, happy, and useful life; whereas, unwarned, he might soon collapse into helpless invalidism.”

TREATMENT.

Digitalis in Aortic Disease.—It is still very commonly held that digitalis should not be given in cases of aortic-valve disease, or, if given, should be used with much greater caution than in mitral disease. This view is strongly opposed by Alfred G. Barrs.² His argument is as follows: “Essentially, that which we have to treat in any given case of valvular disease, mitral or aortic, is the effect produced by that lesion upon the blood-pressure, and through it upon the capillary circulation; and that effect is always of the nature of failure of the circulation.

“Now, is there any essential difference in the kind of failure in the two diseases or in the method by which the valvular lesion produces this failure. It seems to me that there is no difference.

“There is very little doubt, I think, that those who hold that it is improper or dangerous to give digitalis in cases of aortic disease take their stand mainly upon the teachings of pharmacology; and the question I wish to raise is, Are the teachings of pharmacology in this regard confirmed by clinical experience? My own answer to the question is, that they are not. A fairly large experi-

ence has taught me that there is no danger in giving it in any case of aortic disease requiring treatment, and that in many cases its use has been followed by benefit just as marked as in any case of mitral disease."

As in other forms of valvular disease, so in aortic disease, there comes a stage in which we can do no more. Though in such cases Barrs has seen digitalis fail, he has never seen it do harm. Small doses of 3 or 4 minims (0.19 to 0.26 gramme) are useless, but in efficient doses digitalis is just as much the remedy for aortic as for mitral disease.

During the past two years Barrs has had under treatment, among the out-patients at the Leeds Infirmary, twenty-four cases of uncomplicated double aortic disease. They have all been continuously taking tincture of digitalis in 10-drop doses, and all have derived more or less benefit from it, some being able to follow laborious occupations while under its influence. In no case was any damage done by it. Barrs has tried strophanthus, adonidin, sparteine, and the other suggested substitutes for digitalis, in efficient doses, and has found them practically of little or no value, as compared with digitalis.

George W. Balfour, of Edinburgh, ¹⁵_{Sept.} in an article on the action of digitalis in cases of aortic regurgitation, says that a slow pulse not only gives fewer opportunities for regurgitation, but, though it is indubitably accompanied by a prolonged diastole, the regurgitation is not thereby increased, the reflux is actually diminished by a slowing of the heart's action, and the balance of the circulation made more equable. Digitalis, therefore, in slowing the heart, is not hurtful in aortic regurgitation, but beneficial. A more important effect is, that it increases the elasticity of the muscular tissue, so that this expands and contracts more completely and perfectly; and, as all the blood passes more frequently through the heart than through any other muscle, this action is specially exerted upon it, and is manifested at a time when the other muscles are practically uninfluenced. We cannot overestimate the importance of such an action on a failing heart. An aortic heart will be found as amenable to the beneficial influence of digitalis as any other failing heart. Larger doses are, however, required. But little influence is produced by less than three times as much as would suffice for a mitral heart. Should the pulse under this treatment

become abnormally slow, which is not at all usual, and certainly not needful to secure benefit, we may rest assured that excessive regurgitation is not thus promoted; and, though sudden death is not at all unlikely to happen in a badly-compensated aortic heart, whether it is treated with digitalis or not, this drug is never to blame for this. The judicious use of digitalis is the most efficacious treatment in all cases of failing heart, whether this failure is accompanied by aortic or mitral regurgitation. The tonic influence of digitalis on the heart in failure dependent on arteriosclerosis alone is hindered, unless some drug is combined with it which unlocks the arterioles, and so prevents an increase of the blood-pressure already abnormally high.

However free the regurgitation, and whatever may be the pulse-rate, there is no need for treatment as long as the heart, and especially the left ventricle, retains its tone and vigor, and there is neither breathlessness nor cardiac suffering.

The only objection urged against its use is, that sometimes by it the pulse-rate is reduced below the normal, and thus there is a longer period during which regurgitation may continue. The reply to this is, that, to obtain all the benefit that digitalis can bestow, it is quite unnecessary to reduce the pulse-rate below normal; but if this is accidentally done, the elasticity and vigor of the ventricle are by this time so much restored that there is no risk of its being overwhelmed by any excess of regurgitation, if, indeed, there ever is any such danger, which has never been proved.

Seymour Taylor² points out that there is no comparison between the action of the aortic valve and that of the mitral. The strain on the former during diastole is much heavier and more sudden than on the latter during systole. In aortic incompetence the danger is from sudden rather than gradual failure of the left ventricle. But in cases of aortic incompetence complicated with mitral insufficiency, digitalis may be given with advantage in consequence of the "safety-valve" overflow allowed by the mitral. Here the overdilated ventricle is relieved by an expansile auricle and accommodating pulmonary veins and plexus. In the cases where there is aortic insufficiency alone, the ventricle has to bear the strain of the return pressure.

In opposition to Barrs's favorable experience with digitalis, Taylor mentions the case of a young practitioner who came to him

in distress, owing to having prescribed digitalis in three cases of pure aortic regurgitation. The result was disastrous in each case within forty-eight hours. In reply to Taylor, Barrs,² suggests that such cases would require the most searching scrutiny before they could be accepted as examples of the fatal use of digitalis. It seems to him far more reasonable to conclude that the disease, and not the drug, was responsible for the fatal event.

Cory,² believes that many of the unsatisfactory results in the treatment of aortic regurgitation by digitalis are due to too large a dosage. In his experience, doses of 3 or 4 minims (0.19 to 0.26 gramme) of the tincture have produced excellent results, though previously, after larger doses, epistaxis and faintness had occurred. "The fact is, digitalis is a much more powerful drug than is generally supposed, even 1-minim (0.06 gramme) doses producing an effect on the pulse-rate." He believes the evil consequences ascribed to the drug, in prolonging the diastole and increasing the regurgitation, to be merely theoretical, or at any rate much exaggerated, because, by a judicious use of the drug, increased vigor is imparted not only to the cardiac muscle, but also to the muscular coat of the arteries. They are better supplied with blood; consequently, tone and elasticity are increased, greater contractile power on the column of blood is induced; and, further, an increased facility to its onward flow, a more regular heart's action, and an improved nutrition is the result.

Treatment of Cardiac Asthma.—Heitler,²⁴ considers the subcutaneous injection of morphine and ether the most rational treatment of severe paroxysms of cardiac dyspnoea. Digitalis and strophanthus act too slowly. Morphine is a certain and unique remedy for dyspnoea. In mild attacks morphine and ether may be given internally, and the skin excited by flagellation with cloths wet with cold water. The dose of morphine should be rather small to begin with: 0.003 to 0.005 gramme ($\frac{1}{20}$ to $\frac{1}{12}$ grain). Injections of ether should be repeated if the pulse continues small. Alcohol, tea, or coffee should also be given. In some cases dyspnoea disappears after inhalations of oxygen,—a remedy indicated theoretically, because the dyspnoea is produced by the accumulation of carbonic acid in the blood owing to stasis in the pulmonary circulation. But when the dyspnoea is at the height of a paroxysm, inhalation of oxygen is impracticable.

Treatment of Permanent Cardiac Pains.—The tincture of piscidia erythrina is strongly recommended by Liégeois²⁰² for the continued painful cardiac sensations often encountered in cases of chronic myocarditis, endarteritis, in the gouty, aged, and with tobacco-users. In several cases piscidia proved quite as analgesic as antipyrin. It afforded rapid and durable relief, and there were no disadvantages attached to doses of 20 drops in the morning and afternoon. As much as 80 drops daily may be given, and continued for a month without interruption. As the tincture does not keep well, it should be prepared only in small quantities.

Mechanical Treatment of Venous Stasis.—Buys⁸⁶⁸ reports favorable results obtained in a hospital at Bologna by the use of the "esocarde," an apparatus devised by Salaghi, of Rome, in 1883. The esocarde is an instrument constructed so as to exercise compression of the portal system. Compressions are made by a number of bands which encircle the abdomen at the base of the thorax, and which are tightened or relaxed by the raising or lowering of a weight. In order not to interfere with respiration, the compression is made only during expiration. These rhythmical contractions increase vascular tension by restoring to active circulation the mass of blood arrested in the dilated portal system. This treatment is especially indicated in mitral disease. Experiments with this apparatus were very successful, especially in cases where digitalis had been of no effect. Dyspnœa, palpitation, cough, præcordial pain, and arrhythmia were much diminished. Appetite and strength increased. The relief so obtained was lasting, and some of the patients were able to leave the hospital in a very few days. Digestive troubles were sometimes aggravated in anæmic patients.

Diuretin in Cardiac and Renal Affections.—Masius⁶⁴ reports 12 cases of valvular disease, with considerable œdema, successfully treated with diuretin-knoll, in doses of 5 to 7 grammes (1¼ to 1½ drachms) daily. In 2 cases only there was no relief, and in 1 of them the œdema increased. In both of these cases digitalis was successful in removing the œdema. In several of the cases in which diuretin succeeded, digitalis and strophanthus had been tried without effect. In 4 cases of nephritis diuretin failed in 2, but in these 2 digitalis also failed. In general, the pulse was not directly affected, but became slower, stronger,

and more regular as the œdema diminished. The following are the author's conclusions:—

Diuretin is an energetic diuretic; it augments not alone the quantity of water eliminated, but it increases also the solid constituents of the urine. The diuretic effects are ordinarily manifested at the end of twenty-four hours, and continue under the influence of the same doses. The diuresis becomes less active after disappearance of the œdema. Diuretin gives the best results in general dropsy due to insufficient cardiac action. It frequently produces considerable effect where digitalis and other diuretics fail. The unsuccessful cases may be due to individual peculiarity or to some alteration in the kidneys.

E. de Renzi⁶⁴ has employed diuretin successfully in numerous cases of œdema, more or less generalized, and especially in a case of mitral insufficiency with relative insufficiency of the tricuspid valve,—a case in which digitalis had not made any appreciable modification. He gives 45 to 90 grains (3 to 6 grammes) a day, at intervals of two to three hours.

Coronilla.—Poulet³² thinks that coronilla has fallen into a neglect which is unmerited, in view of the very favorable results published by Spillman and Haushalter. He has employed the drug in a large number of cardiac diseases, using a preparation of the entire plant. As a result of his great and unexpected success with this drug, he is convinced that it is not simply a succedaneum of digitalis, but superior to it, and capable of rendering good service in cases where digitalis is inefficacious or injurious. It is especially useful in combating certain reflex disturbances, vertigo, dyspepsia, paroxysmal tachycardia, pulmonary hyperæmia, in aortic disease, etc. It is suited to debilitated, nervous cases, especially on account of its property of aiding digestion. Digitalis is still undoubtedly the best remedy in conditions of asystole. The action of coronilla resembles that of sparteine. The writer reports cases to show its good effects in cardiac disease.

DISEASES OF THE MOUTH, STOMACH, PANCREAS, AND LIVER.

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PHILADELPHIA.

DISEASES OF THE MOUTH.

Stomatitis.—Ollivier¹¹⁸_{Jan.} traces a local outbreak of aphthous stomatitis to the milk of cattle affected with foot-and-mouth disease; Laho⁶⁷⁴_{July}; ⁹⁹⁶_{Sept. 10} indicates the connection between this disease in animals and in human beings, as exhibited by an epizootic in Brussels, in February. He likewise asserts that it may be transferred by milk. Forchheimer, of Cincinnati, ⁵¹_{May} believes that such an origin is rare in America, and favors the view of multiple causation. He regards the lesion as an herpetic eruption, produced by some form of deleterious material in the circulation, having its origin in various processes, bacterial or otherwise. Siegel⁶⁹_{Dec. 3, '91} proposes the name of "mouth-plague in man," and suggests its identity with scurvy, which represents the severest cases, as aphthous stomatitis represents the mildest. Ulceration of the tongue, exanthem, hæmorrhages, and leucocytosis were observed in an epidemic which was traced to cattle.

Marandon de Montyel¹⁰⁰_{Dec. 31, '91} reports two cases of stomatitis from potassium bromide, affecting the gums only, and cured by the use of potassium chlorate. Lermoyez, ¹⁴_{June 22} in describing a case of stomatitis following the use of a gargle of mercury cyanide for amygdalitis, expresses the opinion that the specific toxic origin of the affection must be conceded, though we may admit that bacterial infection of the weakened tissues may aggravate it. Galippe, in opposition to this opinion, ⁸_{Aug. 3} re-asserts his belief in the purely septic origin of all forms of the disease, and claims that antiseptis of the mouth and teeth, not withdrawal of the drug, is the means of curing, as well as of preventing, so-called mercurial stomatitis. Saint-Germain¹⁰⁶_{June 1} believes that mercury causes an inflammation of the mucous membrane, upon which a septic process is engrafted.

(C-1)

Withdrawal of the drug and gargling with potassium chlorate bring about slow improvement; antiseptic washes hasten the cure.

[I am in full accord with this view, and in my own experience have found the best of local applications to be a solution of hydrogen peroxide flavored with one of the aromatic antiseptics.—ED.]

Impetiginous diphtheroid stomatitis has been studied by Pou-lain,²¹²_{Aug. 25} who confirms the observations of Sevestre (ANNUAL, 1892, vol. i, C-1). A case of genuine diphtheritic stomatitis is reported by Thiercelin.¹⁵²_{June 16} The patient was a woman of 30, previously in good health. There was fœtor of the breath, profuse salivation, and painful tumefaction of the submaxillary glands and surrounding connective tissue. Articulation was painful. The inferior aspect of the tongue, the floor of the mouth, the interior surface of the cheeks, and the external surface of the jaws, especially the lower jaw, were covered with a grayish false membrane, detached with difficulty and revealing an eroded hæmorrhagic surface beneath. The false membrane rested on an infiltrated base. The palate, pharynx, tonsils, and palatine folds were free from the membrane, which contained Loeffler's bacilli, but neither streptococci nor staphylo-cocci. There was slight fever and headache, and no albuminuria. Recovery was complete in eighteen days. The treatment consisted in stimulation, nutrition, inhalation of carbolic-acid spray, and frequent applications of a lotion of salicylic acid, 10 parts; alcohol and glycerin, each, 50 parts.

G. W. Sequeira, of London,²_{June 11} reports a series of cases, in one family, of diphtheria followed by ulcerative stomatitis, diphtheria without stomatitis, ulcerative stomatitis without recognizable diphtheria; the first two cases being in adults, the last in a child of two years, and occurring five days after removal from the infected house.

Neumann,⁶⁹_{June 13} in exhibiting a case of Bednar's aphthæ, declared his adherence to the doctrine of Epstein, that the ulceration is caused mechanically, by the washing of the child's mouth. He has seen a case so late as the tenth month. Recovery usually takes place three or four days after the washing of the mouth is stopped. If necessary, borax-water or a weak solution of corrosive sublimate (1 to 5000 or 10,000) may be applied topically by a cotton wad. The affection is not to be confounded with varieties of infectious stomatitis. Pianese⁵⁸⁹_{Oct. 112} states that cachectic aphthæ,

or Riga's disease, occurs in breast-fed children of healthy parents, appearing as an ulceration under the tongue, close to the frænum. "It is about the size of a flax-seed, and gradually enlarges to the size of a sixpence. It is gray in color and painless. The border is irregular and not sharply marked, and extends somewhat over the sound tissue. It may cause death, or, after a long time, recovery may take place. The children waste in flesh, their skin becoming of an earthy hue. Enlargement of the liver and spleen occur. There is no fever. Beginning at the age of three or four months, it frequently lasts until the twentieth month. It is mostly hereditary, and only seldom do the children of such families live, unless nursed at the breast of a healthy woman. A woman of an infected family may cause the disease in a healthy child. The autopsies show slight hydrocephalus (subarachnoid), fatty degeneration of the liver, and of the cortical substance of the kidney. The author has discovered characteristic bacilli in the organs of the child and the milk of the mother." Cherubino¹⁸⁸⁴_{Mar} identifies the affection with the ulcer of dentition described by Roser, and the pseudomembrana sublinguale of many Italian authors.

Cancrum Oris.—A case in an adult is reported by Paul Ziegler, of Munich.¹⁸⁸⁴_{Feb. 16} The patient, a man of 28 years, had an attack of diphtheria in 1889; later, an aphthous stomatitis. In May, 1890, mercurial stomatitis was caused by calomel, but recovery was perfect. In October, 1890, noma developed suddenly. Under antiseptic treatment and good nourishment, the process came to an end in about fourteen days, and healing of the edges of the perforation took place, the defect being partially obliterated by cicatricial contraction. Recurrence took place December 21st, recovery ensuing in about four days. February 5, 1891, recurrence was again manifest, extensive gangrene, hæmorrhagic nephritis, and death following.

Fatal septicæmia, after apparent recovery from *cancrum oris*, occurred a little over one month after the initial lesion, in a child of 3 years, under the care of S. M. Wheaton, of London.¹⁸⁹¹_{Sept. 24} The necropsy showed general encephalitis and tubular nephritis. The author believes the case to be an illustration of secondary infection, the organisms gaining entrance to the circulation when the clot in some thrombosed vein in the cheek broke down. Of further interest was the presence of extensive nephritis without albuminuria or œdema.

Brandon, of Golden Pond, Ky., ¹²⁰_{Sept.} relates a case of cancrum oris, following whooping-cough, in a girl of 3½ years of age, in which, after extensive destruction of tissue, recovery seemed apparently sure, when gangrene of the jaw occurred, accompanied by abdominal ascites, and death took place two months after the first appearance of the disease.

Thrush.—Altmann ²²_{Aug. 21} records a case of thrush (stomatomycosis) occurring in a woman, aged 60 years, four days after critical defervescence in pneumonia. Under the use of a sublimate lotion the fungus disappeared in eight days.

Antisepsis of the Mouth.—According to Sanarelli, of Siena, ⁵⁰_{No. 25} normal human saliva is a poor culture medium for pathogenic micro-organisms in general, and will sooner or later destroy them, when not too great in number; and while the bacilli of diphtheria and the pneumonia cocci can live in it for a prolonged period, the former do not develop, and finally die; and the latter, although retaining their reproductive power, lose their virulence.

Torras Pascual ²⁶_{Mar.} advises, to correct fœtor of the breath, when the mouth is in fault, rinsing it frequently with a warm, dilute solution of potassium permanganate, one crystal in half a tumblerful of water. [In my experience, a diluted solution of hydrogen peroxide (2 or 3 volumes), flavored with a few drops of the oleoso-balsamic mixture of Hoffmann, is among the best of prophylactic mouth-washes.—Ed.]

DISEASES OF THE TONGUE.

Glossitis.—George Homan, of St. Louis, ³⁸⁴_{Apr. 1} describes a case of septic glossitis following a bite whilst chewing gum, the patient being in an alarming condition for two days, but recovering in about a week. Investigation showed that the gum had probably been the means of conveying septic infection to the wounded tongue. L. Hahn, of Pyritz, ⁶⁹_{Aug. 16} reports a case of superficial glossitis, in a woman aged 25 years, with carious teeth. The disease, uninfluenced by extraction of teeth and therapeutic measures, finally healed spontaneously.

Psoriasis.—Feibes ¹⁴_{No. 25} reports eleven cases of psoriasis of the tongue, successfully treated by topical applications of a concentrated solution of chromic acid. After use, the mouth was rinsed with chloroform-water to neutralize any excess of acid and avoid poisoning.

Hairy Tongue.—Two cases are reported by Masters,² Nov. 14, '91 one by Anderson Smith,² Nov. 14, '91 and one by D. W. Montgomery,⁷⁷ Jan. I have noticed a black pigmentary deposit upon the teeth, in two cases of hairy tongue, in patients with pulmonary tuberculosis. A specific microbe could not be isolated.

Ulceration.—Bagnet, of Rouen,²⁰⁸ Mar. 1 observed, in a girl of 9 years, a painful and persistent ulcer of the tongue at a point which, on lateral movement, corresponded with the right lower lateral incisor. This tooth was slightly rotated, presenting an oblique antero-posterior plane. A prothetic apparatus remedied the deformity, and the ulceration healed. Fournier discusses¹⁵² Dec. 11, 16, '91 the differential diagnosis of lingual ulcerations, and also writes on lingual hydroa.¹⁰⁰ Aug. 26 Charles A. Morton, of Clifton, England,² Jan. 9 showed a specimen of tuberculous ulcer at the tip of the tongue, in a man aged 55 years. Several minute ulcers had coalesced. There was less induration than in epithelioma. Microscopic sections showed the tissue to be infiltrated with small round- and giant-cells, containing numerous tubercle bacilli. The tuberculous growth extended quite half an inch below the ulcer. The submaxillary glands were caseous. There was advanced pulmonary and laryngeal phthisis, also tubercle of one epididymis. Morton showed another specimen, from a man aged 34 years, with signs of phthisis at one apex. Penrose, at the same society, described a case in which there was an ulcer of the tongue in a child who had died of tuberculosis, both the lungs and larynx being affected. The lesion contained giant-cells and tubercle bacilli, and was situated just in front of the epiglottis. Hadden had seen many instances in which the ulceration of the tongue seemed to be the initial tuberculous lesion. Besnier²¹² Feb. 10 reports a case of acute tuberculosis of the tongue, in a woman aged 32 years, of scrofulous history, not hereditary. The rapid march forbidding extirpation, the following solution was employed topically: cocaine, 2 grammes (31 grains); carbolic acid, 0.50 gramme (7½ grains); cherry-laurel water, 10 grammes (2½ drachms).

Wiglesworth, of Liverpool,¹⁸⁷ Jan. showed a specimen of tuberculous ulceration of the tongue, taken from a male epileptic aged 26, who had died of advanced pulmonary tuberculosis. The ulcer, which occupied the greater portion of the anterior third of the tongue, was first observed three months before death.

Tumors.—I. P. Lang⁸⁵²_{No.3;}²_{Sept.17} describes two cases of benign tumors of the tongue. The first case was that of a woman of 22 years; the tumor, which was round, indolent, and the size of a hazel-nut, occupying the dorsal aspect of the tongue, to the left of the median line, nearer to the root. It had been growing steadily for twelve years. On removal, which was followed by recovery, it proved to be a fibro-chondro-osteoma lipomatodes. The other case was a typical adenoma, the size of a plum, growing from the root of the tongue, close to the epiglottis, in a girl of 13 years. Its removal was also followed by recovery.

A. Rosenberg,⁴⁹_{Mar.21,}⁴⁵¹_{Apr.7; July} has studied the tumors observed at the base of the tongue. Polypi or hypertrophy of the lymphatic tissue are caused by local irritation, or by some general disease, as scrofulosis; cysts originate in congenital remains of branchial clefts and in retention; papillomata are rare; fibromata are also rare, and may be of the simple or mixed variety, harder than the surrounding tissue, and of a different color; carcinoma is hardly ever primary and is rare secondarily; sarcoma is still rarer, and is usually an extension from surrounding parts.

Sometimes the foramen cæcum is prolonged into a canal, running backward (ductus excretorius linguæ). Into it empty numerous mucous glands. At times it extends to the hyoid bone. Dermoids may arise from this canal, also from branchial fistulæ. Thyroid dermoids or congenital adenomata may occur, arising from obsolete parts of the digestive tract. They resemble the thyroid gland in structure. To this group belong the so-called accessory thyroids.

An important and instructive case is reported by Trekaki and Le Normand, from the service of Mauriac,¹⁰⁰_{Mar.17} in which an epithelioma of the tongue was mistaken for syphilis. The absence of functional symptoms of carcinoma, and especially of pain; the good general health of the 50-year-old man; the fact that twenty-five years previously he had had a chancre; the situation of the lesion upon the border of the tongue; and the absence of an indurated base, led to the error in diagnosis. When extension of the lesion, great glandular involvement, emaciation, and cachexia proved the case to be one of epithelioma, it was too late for surgical intervention.

Tuberculous ulceration of the lips and of the mucous mem-

brane of the cheeks, in a man aged 36 years, is described by H. Müller.²¹⁴
Aug. 1 The patient had presented evidences of tuberculosis at one apex, with tubercle bacilli in the sputum, but these had disappeared after residence at Davos. In the absence of this history, the diagnosis of primary tuberculosis of the lips would have been made.

Salivary Glands.—Walther¹⁰
No. 7 observed a number of cases of chronic inflammation of the canaliculi of the salivary glands, with gaseous infiltration of the excretory ducts and the glandular lobules. He believes that air obtains entrance into the dilated orifice of the duct of Wharton or the duct of Stenson, during the movements of mastication. Treatment consisted in antiseptic lavage and compression of the gland.

A case of reflex ptyalism from dental irritation, remedied by extraction of the offending roots, is reported by Pietkiewicz.¹⁶⁴
June 20

DISEASES OF THE STOMACH.

Tests.—The scientific accuracy and clinical value of the various methods for testing the gastric secretions and the functional efficiency of the digestive organs have formed the basis of many articles during the year. Among the more important communications may be mentioned those of Arnaud,⁴⁶
Jan. 20, June 16 Sansoni,⁵⁸⁹
May 21, July 8, 9 Witmann,³⁶⁶
N.P., 24 Rosenheim,⁶⁹
Mar. 21, Apr. 7 Biernacki,³¹⁹
May 21 Dmochowski,⁵⁷
Nov. 29, 91 Hoppe-Seyler,⁸⁴
May 10 Mathieu and Rémond,¹⁰⁰
Feb. 16, Mar. 1 Tschlenoff,²¹⁴
Nov. 15, 91; Feb. 15 Marino and Dutto,⁵⁸⁹
Oct. 24, 91 Riva-Rocco,⁵⁸⁹
Oct. 24, 91 Cavallero,⁵⁸⁹
Oct. 24, 91 Forlanini,⁵⁸⁹
Oct. 24, 91 Reale,⁵⁸⁹
Oct. 24, 91 Honigmann,⁶⁹
June 22 Mintz,⁶⁹
Dec. 24, 91; Feb. 11 Boas,⁶⁹
Dec. 17, 91; Apr. 29 Winter,⁶⁹
July 24, Aug. 4 Martius,³⁴
May 2 Mierzynski,³¹⁹
No. 21 Bourget,⁸¹
Aug. 4 Macnaught,⁹⁰
June and Gillespie.¹⁵
Aug. Kössner, of Prague,⁸⁸
Sept. 21 reviews the various methods of quantitative analysis of the acid contents of the stomach, and concludes as follows: 1. The polariscopic method of Hoffmann gives only the free acid. It is exact and comparatively easy. Methyl acetate may be used in place of cane-sugar. 2. The method of Winter will give too high an estimate of the total acidity. This is principally due to the fact that in the process of evaporation and calcination, as applied to a solution containing acid phosphate and chlorides of the alkaline earths, hydrochloric acid is driven off; so that the quantity of mineral chlorides forming the subtrahend is too small, and, therefore, the remainder, representing the HCl of the stomach-contents, too

large. 3. Braun's method gives too high an estimate of HCl, as part of the result is due to acid phosphate. 4. Leo's method, while not exact, gives results sufficiently close for clinical work. Organic acids must be removed; this is most readily done by extraction with ether. 5. Sjöquist's method involves loss of HCl when phosphates are present, and cannot be used under such circumstances.

Le Gendre¹⁴ forcibly states his reasons for ascribing to the study of gastric chemistry a limited field in practical medicine, and O. Katz, of Vienna,⁵⁷ shows that no diagnostic conclusion can be based on the urea-chloride ratio of the urinary secretion.

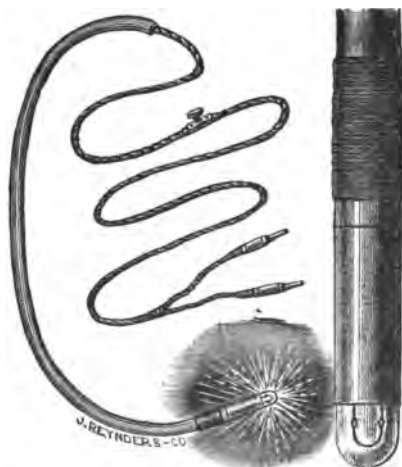
Proteid hydrochlorides is the name proposed by A. Lockhart Gillespie, of Edinburgh,²² to replace that of "combined hydrochloric acid," in designating the combinations of hydrochloric acid and proteids formed in gastric digestion, which have the same acid value in neutralizing soda-solution as the original HCl, but will not respond to the color-tests for free HCl. He prefers for quantitative estimation a modification of Hayem and Winter's process, drying the fluid at 100° C. (212° F.), and titrating again. The free acid is driven off and the proteid hydrochlorides remain. Their antiseptic property is slight. The *staphylococcus pyogenes aureus* will grow in a 68-per-cent. solution, while the amyolytic action of saliva goes on at double the acidity that would stop it if the HCl were free.

Tolcher Eccles¹⁵ found that in health, when Günzberg's capsule was swallowed one hour after a test meal, the average time elapsing before the appearance of iodine in the saliva was 78.5 minutes. A. Symons Eccles employs, in connection with this, the potassium-iodide test of Penzoldt, or the rhubarb test of Brunton, in order to establish the absorption rate, independently of the solvent power of the gastric juice. He illustrates the value of the procedure by three cases, in two of which, despite the gravity of symptoms, the reaction was not uniformly or markedly delayed, and recovery ensued; in one, while nervous rather than gastric symptoms were marked, the reaction was persistently delayed beyond three hours, and a diagnosis of malignant disease based upon this fact, despite the absence of tumor, was confirmed by the necropsy. The case was one of sarcoma, beginning in the œsophagus, extending along the smaller curvature and posterior wall of the stomach, and involving the liver and pancreas.

Diagnosis.—According to Iedelli,^{596 996} importance is to be attached to percussion of the semilunar area of tympany (Traube's space), limited by the costal border below and above by a curved line leaving that border at its origin, to rejoin it at the anterior extremity of the tenth rib. With Rondot he divides the superior line into gastro-pulmonic and gastro-splenic segments, and proposes for the inferior line division into gastric and gastro-colic segments. He advises deep percussion to limit the superior line, superficial percussion for the inferior line. When the gastric contents are too long detained, periodic exploration will elicit lessened resonance to light percussion. In other cases the same sign, found some hours after meals, is due to the accumulation of mucus and pathological secretions, as shown by vomiting. When vomiting is absent neoplasm must be thought of, but may be excluded if the sign is inconstant, as shown by examination at varied intervals. In dilatation the degree of ectasia is shown by the varied elevation of the superior line.

Einhorn, of New York,¹ recalls his method of translumination or gastrodiaphony. The accompanying illustration shows the apparatus, which is to be swal-

lowed by the patient; an electric lamp, attached to a soft-rubber tube containing the connecting wires. The patient, fasting, drinks one or two glassfuls of water, and the apparatus, lubricated with glycerin, is then inserted. In a dark room, the patient being either in a standing or lying position, a reddish, luminous zone upon the abdomen indicates the outline and position of the stomach. Thickening of the anterior wall, as by neoplasm, obscures or prevents the illumination. The method is especially valuable in delimiting the lesser curvature in gastrectasia and gastroptosis. [I have used the apparatus with satisfaction.—Ed.] Hering and Reichmann's lamp,¹¹⁶ presented by Renvers and Pariser to the Berlin Medical Society,^{84 41 2} appears to be larger than



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that of Einhorn, and is covered by a small glass vase filled with water. They wash out the stomach and introduce $1\frac{1}{2}$ to 2 litres (quarts) of water before inserting the lamp. The patient must be standing, as the full stomach falls away from the abdominal wall. A case of carcinoma was thus diagnosed and confirmed by section. The tumor appeared as a dark spot in a light field.

Splanchnoptosis.—Poltowicz¹⁹⁷_{Nov. 4, 1917} studies the different forms of Glenard's disease and illustrates by detailed cases its diagnosis and that of carcinoma by means of direct insufflation. His conclusions are as follow: 1. Splanchnoptosis (Glenard's disease) is a morbid entity. 2. In its classic form it comprises gastropotosis, enteroptosis, nephroptosis, often hepatoptosis and splenoptosis, which are united by common etiology, symptoms, and indications. 3. Nevertheless, each ptosis may be found singly or in varied combination. 4. Gastropotosis is usually associated with gastrectasia. 5. Insufflation of the stomach always demonstrates the existence or non-existence of ptosis of that organ. This diagnostic procedure is likewise highly useful in carcinoma and stenosis of the stomach. Buccal or direct insufflation is easier, quicker, more certain, and in every way to be preferred to other methods of distension of the stomach. 6. Nephropleptic palpation and the "thumb method" of Glenard are the preferable procedures for exploration of the kidney and liver.

Rumination.—S. Hille³⁶⁹_{p. 66},⁶⁸_{Sept.} reports three cases of rumination in men aged 45, 21, and 53 years, respectively, the last two being father and son. Szczypiorski¹⁶⁴_{Apr. 21} reports a case in a female idiot of 35 years. Shattering, of St. Louis,³⁶⁴_{Oct. 1} describes, under this title, a case in a refined woman of 24 years, which might be more appropriately termed hysterical regurgitation or anorexia nervosa. In this case diet, lavage, and electrization brought about recovery. James Hendrie Lloyd, of Philadelphia,⁹⁹_{Aug. 26} had a case of hysterical trembling, in which anorexia nervosa developed. By a mistake, a large dose of ordinary saltpetre had been given instead of sulphate of magnesia.

Achylia gastrica is the name proposed by Einhorn,⁵⁹_{Nov. 11} for the clinical condition known as atrophy of the stomach, phthisis ventriculi, or anadenia ventriculi. He describes four cases, one previously reported. In one case rumination co-exists, and the patient, a man of 52 years, seems to be in robust health. As a boy he

lived principally on vegetable diet, but now eats anything. The probability is that digestion is performed largely in the small intestine. Ewald, of Berlin, ⁴_{Nov. 30, 97} under the term *anadenia ventriculi*, discusses the same condition. The presence or absence of HCl in the gastric juice no longer possesses definite diagnostic significance. The three chief types in which it is absent are carcinoma, chronic catarrh with resulting anadenia, and states of severe nervous depression. Anadenia is differentiated from cancer by the absence of pain, vomiting, and hæmatemesis; from neuroses only by the general symptoms, the latter being part of a general neurotic condition. Ewald relates an instructive case, benefited by diet, faradization, and daily introduction of $\frac{1}{2}$ litre (1 pint) of $\frac{1}{2}$ -per-cent. solution of HCl, which the patient was soon able to do for himself. After two and a half years, there is still complete absence of free HCl and the test-meal is brought up unaltered. Digestion must take place in the intestine.

A case of apepsia, with great elevation of the urea-chloride ratio, is reported by Hayem, ¹⁵²_{Feb. 28}. The phenomenon is similar to that found in the opposite condition of hypersecretion of gastric juice, but is dependent in this instance on the diet; hence Hayem warns against diagnostic error. Shepherd, of Montreal, ¹³⁰_{Jan.} found in the dissecting-room two specimens of atrophy of the stomach—in two adult women who had been inmates of the Longue Pointe Asylum. Riegel, ⁶⁹_{May 26} insists upon the frequency of the condition—known as Reichman's disease—of continuous secretion of gastric juice. Mathieu ³⁶⁰_{May; May 26} reports a case followed by ulcer, in which sudden death resulted from perforation during apparent recovery.

Gastric Ulcer.—Korczynski and Jaworski ³²⁶_{B. 47, B. 6, 6; Apr. 26}, ⁴¹ have found that, in most cases of gastric ulcer, there is increase, not only in the quantity of gastric secretion, but also in its acidity, and that there is a correspondence between the degree of severity of subjective and objective symptoms. Acidity is greatest at the time of hæmorrhage. The secretion is independent of food-taking. The urine is diminished in quantity, its specific gravity increased, its acidity diminished. Alkaline reaction of the urine, with diminution or loss of chlorides, is of grave import. With recovery, untimely secretion of gastric juice ceases. Microscopic examinations of sections of mucous membrane removed during operation upon three living patients, and of one specimen taken after death, from

a case in which fatal hæmorrhage occurred, showed detachment of superficial epithelium, with round-celled infiltration beneath, extending into the submucosa and into the tubules; also degeneration and destruction of the central cells, the parietal cells remaining intact. According to the authors, this indicates that, in chronic gastric inflammation, both central and parietal cells are increased in number and the elaboration of acids and ferments is increased; but that the less resistant central cells succumb beneath the abnormal activity, while the parietal cells continue to separate HCl from the chlorides of the blood; the sodium, being re-absorbed into the blood, increases its alkalinity, the urine becomes alkaline and chlorides disappear from it. This is acid catarrh. If the parietal cells yield also, through increase of interstitial tissue, atrophic catarrh and, finally, dilatation result. Nervous symptoms and tetany are ascribed to the loss of chlorides, and not to the absorption of toxic katabolins, because (1) absorption, as proved by the KI test, is practically *nil* in gastrectasia, and (2) the great acidity prevents putrefaction. (Loeb⁴¹_{Apr. 28} properly objects to this remark.)

Gordon, of Sheffield,²_{Jan. 28} showed a specimen of gastro-colic sinus from the body of a woman, aged 22 years, who had died from exhaustion, after an illness of some three years' duration. There had been, at the last, stercoraceous vomiting. Joseph Redmond,²_{June 11} exhibited the stomach of a man of 60, with two solutions of continuity, the larger of which, situated on the posterior wall, measured four inches by two and one-half inches. The floor of the ulcer was formed by the pancreas, to which it was intimately adherent. The small ulcer was situated about one inch to the lower and mesial side of the œsophageal opening, and separated from the larger by a distance of about one and one-fourth inches. Its shape was nearly circular, and was about one inch in diameter. Its floor was irregular, without any trace of hæmorrhage, and at one corner was the perforation which had occasioned the fatal termination.

Sabrazès¹⁸⁸_{Nov. 29, '91} observed a large perforation in the stomach of a man of 30 years, caused by rupture of the adhesions between the liver and stomach, at the site of an old ulcer. The accident was apparently provoked by vomiting following an error in diet. Jayle⁷_{Nov. 21, '91} reports a case of two perforating ulcers of the stomach, occurring in a girl of 20 years. The symptoms were attributed to

intestinal perforation in the left hypochondriac region. The author believes that, while section would have revealed the perforation in the anterior wall of the stomach, it is not probable that the other and posterior perforation would have been discovered.

Liermann⁶⁹_{Feb. 22} reports a series of cases of subphrenic abscess following perforation of gastric ulcers. Potier⁷_{Nov. 22} presented a specimen of perforating gastric ulcer, occurring in a man of about 37 years of age, who had exhibited, in addition to symptoms of dyspepsia, marked neurotic phenomena: absence of pharyngeal reflex, globus hystericus, and hemianæsthesia. There was neither hæmatemesis nor melæna. About twenty-four hours before death, sudden abdominal pain was followed by tympanites and coldness of the extremities. The necropsy showed recent peritonitis, and an ulcer, about six centimetres circumference, occupying the posterior face of the lesser curvature of the stomach. At the upper right border was a crow-quill perforation. To the situation of the ulcer, where it was least exposed to the action of gastric juice, the author attributes the slow, insidious evolution of the disease.

A case of tuberculous ulcer of the stomach is reported by Musser, of Philadelphia,²¹⁰⁴_{v.1, 70} who could find reports of some forty cases only. His patient was a colored man, aged 44 years, who had swallowed the pulmonary discharges instead of expectorating them. The ulcer was transverse, 3 x 1½ inches, with cribriform floor, and was seated in the lesser curvature. Posteriorly, the ulceration extended to the peritoneum; anteriorly was found a small, firm, yellowish tubercle, containing cheesy matter. Adjacent to the cheesy nodule a few firm, submucous, mustard-seed tubercles were seen. The mucous membrane around the ulcer was not thickened. Barbacci, of Florence,³⁷⁶_{Nov. 13; Sept. 17}² found in the pyloric portion of the stomach of a woman, aged 79 years, of whose clinical history nothing was known, two small, round ulcers about one centimetre in diameter, with clean-cut edges; in the base of each was a caseous nodule. Tuberculous ulcers and tubercles were likewise found in the pharynx, the epiglottis, the larynx, the lungs, and the ileum. Inasmuch as the peribronchial glands were healthy and the pulmonary lesions consisted solely of gray tubercles in the same stage of evolution, Barbacci believes the case to be one of primary tuberculosis of the alimentary tract, the pharyngeal lesions being the oldest.

Marks⁶⁶³_{Apr.} reports the unsuccessful result of a gastrotomy upon a dime-museum "glass- and tack- eater," aged 20 years, who had been indulging in his peculiar amusement for about eight years. Large masses of nails, tacks, and fragments of glass were removed from the stomach at the time of operation, and after death 3 ounces (93 grammes) more were taken out; while similar articles were found throughout the intestinal tract. The result of the necropsy is held to indicate that death was caused by ulcerative œsophago-gastritis of traumatic origin.

Gastritis.—Meyer²¹_{Nov. 20} reports the case of a man, aged 41 years, whose illness began as a slight indisposition following a night of overindulgence in food and drink. Toward evening a chill occurred, followed by mental disturbance and vomiting of bile and mucus. Vomiting continued; the abdomen became tender; the pulse small and hard, but regular; the pupils contracted and inactive; the temperature high. Delirium became more pronounced; albuminuria and slight jaundice appeared. The area of hepatic dullness was enlarged and painful, and there were evidences of pleural effusion. Pulmonary œdema set in and death followed. At the necropsy, the right pleural cavity was found to contain a small quantity of turbid fluid, the left pleural cavity clear serum with numerous gelatinous fibrin-coagula. The pericardial sac also contained an excess of clear, yellow serum. The diaphragm was elevated so that the heart lay horizontally. The diaphragmatic surface of the liver and the lower extremity of the ileum, just above the ileo-cæcal valve, were covered with pus and fibrin. The small pelvis contained turbid, purulent, fibrinous fluid. The spleen was conspicuously enlarged. The biliary passages were patulous. The portal vein contained a recent thrombus. The fundus of the stomach presented numerous ecchymoses; close to the cardia, on the posterior wall, was an ill-defined circumscribed area, on incision in which two longitudinal cavities were found, three-quarters of an inch long, containing thickened pus, and seated between the mucosa and the muscularis. The peritoneum, at a corresponding situation, was infiltrated with pus. The inner surface of the dura mater presented traces of a yellowish deposit.

Subphrenic Abscess.—Meyer likewise reports the case of a girl, 21 years old, who had long suffered with gastric derangement,

and who was suddenly seized with symptoms suggestive of the rupture of a round ulcer of the stomach, followed by circumscribed peritonitis. The intense pain in the epigastrium subsided, however, and sharp pain appeared in the left hypochondrium, without demonstrable pleurisy. The temperature was elevated. After ten days slight cold set in, with scanty, rusty expectoration, the sputum containing elastic fibres and fatty pulmonary epithelium. At the same time, a small area of dullness on percussion was evident at the base of the left chest posteriorly, with enfeebled respiratory murmur and fine moist râles. A few days later, blowing breathing was present at the inferior angle of the left scapula. Metallic tinkling could be heard. The left hypochondrium was tumid and tender. After a time dark flakes having an offensive odor were vomited. Asthenia was progressive, and death took place twenty-six days after the beginning of the attack. At the necropsy a large cavity, with dark, gangrenous, disintegrating walls, was found beneath the left half of the diaphragm, bounded on the right by the left lobe of the liver and the suspensory ligament of the liver, anteriorly and inferiorly by the stomach and the transverse colon, and on the left by the spleen. The stomach communicated with the abscess by a small opening in the lesser curvature, which constituted the centre of a cicatrix of considerable size. The diaphragm contained four round, discolored, disintegrated areas, corresponding with which four small areas of infiltration were found in the adhering and pneumonic lung.

Pilliet and Sakorraphos⁷ report from the practice of Straus the case of a man of alcoholic habits, aged 31 years, who, upon admission to hospital, appeared merely to be fatigued, not emaciated, and having a good color. There were catarrhal symptoms, sleep was disturbed, cutaneous sensibility was exaggerated, the tongue was white, digestion poor. The liver was slightly enlarged; no abdominal tumor could be found. The heart and lungs were normal. Complaint was made of pain in the right side. Anorexia increased, but vomiting was not once observed. Slight ascites developed, appearing to confirm the diagnosis of cirrhosis of the liver. It rapidly increased, and emaciation became extreme, the cheeks, though hollow, retaining their color. The pain in the right side became intolerable. The diagnosis was now changed to tuberculous peritonitis, although bacilli were not found in the

sputum. The urine became scanty and red-colored (from urates?), all the symptoms increased in severity, and the patient died about three and a half months after admission. At the necropsy, an apparently cancerous mass was found, which proved to be the stomach, so bound by adhesions to the diaphragm and neighboring organs that it was impossible to isolate it by dissection. The stomach presented the form of a pouch, somewhat larger than two fists. It was completely rigid. On the exterior surface to the left was an oval, reddish mass,—the adherent spleen. The pulp was torn in efforts to detach it. It exhibited amyloid degeneration. Below, likewise adherent to the stomach, was the vena cava, much dilated. A musculo-tendinous band surrounding the tumor was recognized as one of the pillars of the diaphragm. Between the mucous coat of the stomach and that of adherent intestine was a dense, fibrous tissue, of a thickness of six centimetres. Internally, the mucous membrane of the stomach was much thickened and mammillated, not longitudinally, but in communicating folds; presenting no trace of ulceration, and no prominence being distinguishable from the other folds. Histological examination showed the process to have been a plastic inflammation beginning in the mucous membrane. The rapid emaciation was probably dependent on the destruction of the pancreas.

At the same meeting, Doyen presented a stomach the walls of which were uniformly thickened to the extent of one centimetre, and which he considered to be an example of infiltrating carcinoma; Ballet presented a similar specimen, histologically proved to be a sclerosis of the walls of the stomach (plastic linitis of Brinton); while Gombault presented a third specimen, macroscopically indistinguishable from the others, that the microscope demonstrated to be carcinoma. Microscopic investigation is, therefore, indispensable in such cases.

Cornell, of Athens, Ontario, ²⁸²_{Am.} reports a case of sclerosis of the stomach, associated with tuberculous peritonitis, in a man aged 67 years. During life the epigastric region was the seat of a tumor that, when first observed, began two and one-half inches below the xiphoid appendix and extended to within one-fourth of an inch of the navel. It measured two and seven-eighths inches vertically; transversely, three and three-eighths inches. Pulsation of the abdominal aorta elevated, but did not expand it. On

deep inspiration the percussion note was tympanitic, on deep expiration it was dull. There was pain on pressure. Lavage removed bloody and muco-purulent matters, pus was vomited, and there was hectic fever. The tumor increased in size and altered in shape. The percussion note over a portion of it became tympanitic. At the necropsy the omentum was found ulcerated, studded with tubercles, attached firmly to spleen and pancreas; the transverse colon was drawn obliquely over the mass thus formed, accounting for the tympanitic percussion note. The stomach was found high up in the interval between the fifth and sixth ribs, firmly bound to the omentum. Its capacity was reduced to 4 ounces (120 grammes). From the fundus to the pyloric orifice the walls were progressively thickened. Microscopically no distinction could be made between mucous and muscular elements; all were blended in one dense mass of fibrous tissue.

Tumors.—Cleghorn, of Blenheim, New Zealand,⁵⁵⁷ reports the case of a farmer, 57 years old, markedly anæmic, and presenting an inconstant tumor of the abdomen, with paroxysms (always terminating suddenly) of pain, nausea, and bilious vomiting, who died suddenly in syncope. The tumor proved to be the left kidney, enlarged and somewhat displaced. The spleen was enlarged, the stomach dilated and thinned. At the upper and anterior portion of the pylorus was a perforation, and a large polypus, with a clubbed extremity, was found attached to the lower border of the stomach, about three inches from the pylorus. The growth appears to have been a fibroma or fibromyoma, and to have started in the submucosa. The symptoms evidently depended upon its intermittent incarceration by the pyloric sphincter.

Michel,⁸¹ reports a case, in which jaundice preceded gastric symptoms, or the appearance of a tumor, in a woman of 69 years, who died of carcinoma of the pylorus. There was no involvement of the liver, other than the glands of the hilum, which compressed the ductus choledochus. Caven, of Toronto,⁸⁹ presented a specimen of epithelioma at the cardiac orifice of the stomach, with secondary growths in the liver, and stated that during life no symptom pointing to the stomach or liver had been observed, a hæmorrhage from the bowel having been referred to the lower part of the intestine. Surmont and Patoir¹⁸¹ ¹⁵¹ record an instance of sudden death from suffocation, by inspiration of blood

from a gastric hæmorrhage, in a case of carcinoma of the pylorus. At the necropsy, the stomach, not dilated, contained digested blood; and the blood was likewise found in the œsophagus, pharynx and nose, and down the respiratory tract, to the finest divisions of the bronchi.

Zuccarelli ⁴⁶, presented a specimen of gastric carcinoma, which had given rise to multiple perforations of the stomach and consecutive peritonitis. Death took place in collapse. The neoplasm had its origin in the pylorus, and had invaded the greater part of the stomach and epiploon. Poltowicz ¹⁹⁷ relates three cases in which the position and mobility of the tumor were demonstrated by insufflation. O. Pierre ⁵⁵ found, in one hundred and forty-three cases, sixty-eight instances of coincident pulmonary disease other than carcinoma (bronchitis, pleurisy, broncho-pneumonia, pneumonia, tuberculosis). He believes that there is a causal relation. Bronchitis and broncho-pneumonia are nearly always fatal. Pneumonia appears during the last days of life, and has little fever. In pleurisy there is a yellowish effusion rich in fibrin, which distinguishes it from hæmorrhagic pleurisy due to generalization of the infection. The prognosis, however, is grave. Carcinoma of the stomach is more likely to give rise to pulmonary tuberculosis than other forms of carcinoma, through enfeeblement. The author relates a number of cases of thrombosis of the pulmonary artery, consecutive to gastric carcinoma. He believes that in cases where pulmonary lesions exist, but are insufficient to account for the degree of malnutrition, there is likely to be latent carcinoma of the stomach.

Workman ²³ had a case of carcinoma of the stomach and liver, that, from the apparent rapidity of its development (the patient having first complained of malaise four weeks before death), he designated as "acute scirrhus." Rapid enlargement of the mass had been noted while the patient was in the hospital.

Aron, of Berlin, ⁶⁰ showed a specimen of ulcerated medullary carcinoma of the pylorus that had caused neither stenosis nor dilatation, and had not given rise to pain, vomiting, constipation, or other significant symptom, or to a tumor palpable during life. The patient was a well-nourished woman of 78 years, admitted about six weeks before death, for general anasarca with pleural effusion and ascites. The only visceral abnormality discoverable was enlargement of the liver. For three months the patient had been

weak and complained of loss of appetite. A recent proliferative endocarditis was revealed by the necropsy, although fever had never been noted. There were secondary nodules in the liver and a fistulous communication with the colon. The latter is held to have made vomiting impossible. A case of gastric carcinoma in a man aged 78 years, in which necropsy revealed extensive involvement of the abdominal walls, the peritoneum, and the scrotum, is reported by Handerson and Scott.²²²_{May}

King³⁹_{Feb.} communicates a case of ulcerated carcinoma of the cardiac end of the œsophagus, in a woman, aged 77 years, who had presented scarcely any symptoms of illness previous to a gastric hæmorrhage that occurred two weeks before her death. Bond, of Donelson, Tenn.,⁸⁶_{Apr.} records a case of gastric scirrhus in a man of 33 years. Ellett, of Philadelphia,¹¹²_{Mar.} reports, from the service of J. K. Mitchell, a case of colloid carcinoma, terminating in gastric perforation, in a man of 33 years, a native of Belgium.

Weinberg, of Riga,²¹_{June 13} exhibited, as a case of apparent recovery in gastric carcinoma, a woman, aged 76 years, who had been treated for eight months with Fowler's solution. Rulle had noted similar improvement in general symptoms and disappearance of tumor under the influence of condurango.

Wounds.—Fauvel, of Rouen,²⁰⁸_{Apr. 1} relates the case of an hysterical woman, aged 33 years, who shot herself with a revolver of .007 calibre, the ball entering in the left seventh intercostal space, a little outside the nipple-line. A few drops of blood escaped. There was no fever or local pain, even upon inspiration. Pain in the left shoulder was said to be severe, and to have followed the wound immediately. Pulse and temperature were normal. There was no tympanites. Antiseptic dressing, cold milk and soup internally, and absolute rest constituted the treatment. On the fourth day a mild purge caused several stools containing decomposed blood to be passed, in which the ball was found. Recovery was uninterrupted and the hysteria disappeared.

Key-Åberg⁴¹_{Apr. 29}; ²²_{May 11} relates the case of a man who died in coma after several washings of the stomach for opium poisoning. At the necropsy several rents of the mucosa were found. From experiments, he concludes that the presence of the fluid was the cause of the injury, by pressure. Rose²²_{Mar. 11} related two cases of traumatic rupture without internal injury, in one case associated

with fracture of the skull and abscess of the liver, in the other with fracture of the ribs. In both cases operation was followed by recovery. Diagnosis was difficult. The most significant sign is violent and repeated vomiting of blood.

Acute Dilatation.—D. W. C. Hood, of London, ²_{Dec. 19, 78} records an observation upon a girl, aged 19 years, admitted for a condition resembling an abscess of the lower jaw. Five days later she began vomiting a thin, watery fluid, of light-greenish color, without odor, which subsequently became of inky color. Vomiting continued till death, eleven hours later. The necropsy showed enormous dilatation of the stomach, which appeared like a thin, translucent, membranous sac, in some places hardly thicker than writing-paper. It contained 2 quarts (2 litres) of dark fluid. There was acute purulent pericarditis and engorgement of both lungs. J. E. Graham, of Toronto, ³⁹_{Apr. 1} observed a case, in connection with subphrenic abscess, in a man of 35 years. The total duration of symptoms of dyspepsia was six or eight years. The acute vomiting occurred in two attacks, separated by an interval of three weeks. Death occurred about forty-eight hours after the onset of the second attack. Kelnjack, of Manchester, ⁹⁰_{May} records a case occurring in an anæmic and ill-nourished girl of 19 years, admitted for tuberculous hip-joint disease, who died four days after the onset of vomiting, which could not be checked. The duodenum was also dilated. No obstruction could be found. The jejunum and the intestines below the point where the superior mesenteric veins cross the third part of the duodenum were collapsed, and appeared to hang from these vessels as from a pedicle.

Therapeutics.—W. Soltau Fenwick ¹⁵_{Apr.} discusses the dangers of indiscriminately washing out the stomach, instancing six cases of tetany in dilatation of the stomach; one case each of fatal syncope and death in carcinoma of the pylorus, with gastrectasia; perforation in a case of unrecognized ulceration of the stomach; hæmorrhage from unrecognized carcinoma,—all following the introduction of the stomach-tube. He mentions, also, as a warning against considering all tissues healthy until proved otherwise, a fatal instance of rupture of the œsophagus, with two false passages from attempts to pass a stiff tube for forced feeding in melancholia; and a fatal instance of rupture during vomiting, induced by apomorphine, of the adhesions between the stomach

and liver at the site of an old ulcer in an alcoholic subject. Fenwick calls attention to three recorded cases of poisoning from incomplete withdrawal of boric-acid solutions used in lavage, two being fatal, and the third patient recovering after a severe illness.

In the treatment of anadenia ventriculi, Ewald⁴, uses strychnine, belladonna, or physostigmine to increase gastric motor power, but these often fail. Dependence must then be placed on exercise, massage, and faradization by means of Einhorn's electrode. The second important indication is disinfection of the intestinal tract. For this purpose the best substances are bismuth salicylate, resorcin, and benzo-naphthol. The latter may be given in quantity up to 5 grammes (75 grains) per diem without risk. Jaworski⁵²⁰_{Nov. 19}, ²⁶_{July} observed at Davos the effects of overfeeding, combined with open-air exercise, upon the dyspeptic symptoms of 35 patients whose sputa contained tubercle bacilli. In 30 cases all dyspeptic symptoms disappeared (24 patients with bacilli, 6 without; of these, 3 had neurasthenic symptoms and two hysteria); in 9 cases dyspeptic symptoms decreased (8 with bacilli, 1 without; 2 with neurasthenia, 1 with hysteria); in 5 cases there was no improvement (3 with bacilli, 2 without; 3 with neurasthenia, 1 with hysteria). Bodily weight increased in all the patients.

MacIntyre²¹³_{Jan.} deprecates the prescribing of alkalies as correctives of hyperacidity, and urges sialagogue measures. He considers that the physiological importance of the saliva is often forgotten. Nackers¹²⁹_{Feb.} reports a case of gastric disturbance following subacute gout, in which quassine, in connection with other measures, proved useful. Duchenne¹²⁹_{Feb.} found hyoscyamine, in association with sodium arseniate, curative in gastrodynia with spasmodic vomiting, dependent on alcoholic gastritis. [I have found picrotoxin, $\frac{1}{8}$ grain (0.0018 gramme) useful in this condition, and in gastric neuroses generally.—Ed.] Wojnowitsch⁸⁵⁹_{No. 44, '91}; ²¹_{Feb. '90} believes that atropine should be employed to diminish gastric hypersecretion. He reports a case in which 0.00075 gramme ($\frac{1}{8}$ grain), three times a day, proved efficacious after all other treatment had failed. Robin²_{Feb. 4} employs picrotoxin and veratrum viride. When ulcer is present he uses sodium bicarbonate until the immediate danger is passed. For deficient secretion he employs nux vomica.

Coronedi¹⁵_{July} has found strontium bromide extremely useful in vomiting from various causes, and an excellent analgesic in

painful affections of the stomach. He gives it in doses of 15 grains (1 gramme) once, twice, or three times daily. [I have used strontium bromide and strontium lactate, in doses of 15 to 30 grains (1 to 2 grammes), in solution, with glycerin and infusion of gentian, before meals, with much satisfaction, in the symptomatic dyspepsia associated with neurasthenia and lithæmia, the bromide being preferred when insomnia was present.—Ed.]

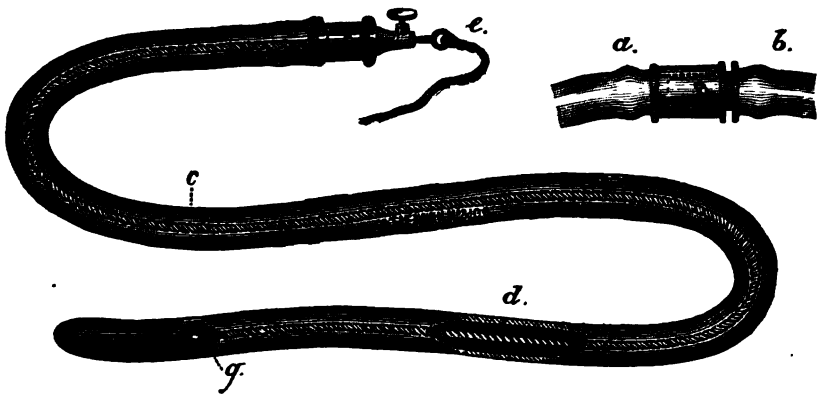
According to Desnos, ⁶⁷_{Jan. 20} solanine is a valuable sedative in painful gastric affections. It is administered half an hour before meals, in pills of 0.05 gramme ($\frac{1}{2}$ grain), of which 1, 2, or 3 may be given daily. Of seventeen cases, in but four did it fail to give relief. These were two of gastralgia, one of long-standing gastritis, and one of cramps of the stomach consecutive to acute gastric catarrh. When pain is intense, the drug may be given in mucilaginous solution. Wagner ⁹⁰_{Jan. 20} finds that condurango, when given with food, slightly improves gastric digestion by increasing HCl, but, continuously administered, it has no sensible effect. Nux vomica always increases the secretion of HCl except in cases of apepsia or chronic atrophic gastric catarrh, in which, like all other drugs, it is powerless. Calcium salts are highly recommended by Germain Sée, ⁶⁹_{Jan. 20}, who uses the bromide, chloride, and iodide in doses of 1 to 5 grammes (15 to 75 grains) per diem. Jakovleff ²⁰⁰¹_{No. 109}; ²_{Sept. 10} finds that hydrogen peroxide increases digestive power and diminishes abnormal fermentation. He gave 4 cubic centimetres (1 drachm) of a 3-per-cent. solution (15 volumes) before meals. [My own experience is the same.—Ed.]

Einhorn, of New York, ⁵⁹_{Jan. 20, Feb. 4} describes an excellent form of deglutible electrode, which he uses in painful affections of the stomach and in cases of motor impairment. A small, perforated capsule of hard rubber contains the terminal, and the conducting cords are protected by a soft-rubber covering. Stockton, of Buffalo, ¹_{July 20} describes improvements in his gastric electrode, which is here illustrated. A No. 13 soft-rubber stomach-tube, twenty-eight inches long, is coupled by a ground-steel joint to three feet of rubber tubing, terminating in the ordinary funnel. Through this the stomach is emptied and a small amount of saline solution introduced. The proximal part of the tube being disconnected at the coupling, there is introduced through the stomach-tube, *in situ*, a spiral electrode, which, when in place, completely closes the proximal opening of

the tube by a ground-steel plug, held in place by a bayonet fastening. The distal extremity of the spiral wire terminates at the upper of the two fenestræ at the lower end of the tube. This arrangement prevents the touching of the mucous membrane of the stomach by the metal point. The conducting cord from the battery is attached to the upper part of the electrode and retained by a thumb-screw.

PANCREAS.

Abscess.—Whitton, of Reefton, N. Z., ²⁶⁷_{July 18} records the case of a man, admitted for fracture of four ribs on the right side, caused by being thrown from a wagon while intoxicated. Fever was



GASTRIC ELECTRODE.

a, the stomach-tube; b, rubber tubing connected by clamp arrangement; c, the stomach-tube; d, an opening in the stomach-tube showing the spiral wire; g, a fenestra in the stomach-tube showing the end of the spiral wire; e, showing the conducting cord fastened in place by a thumb-screw, and the electrode held fast in the tube by a bayonet fastening.

(*New York Medical Journal.*)

never high; there was vomiting, but never of blood; pain near the umbilicus was complained of; tympanites was present. Gradual amelioration took place during five days; on the sixth day the patient became worse; there was weakness, diarrhœa; vomiting of yellowish, fetid pus continued, at intervals, for five hours, when great restlessness was manifested; pus began to be passed *per anum*, and the patient gradually sank, vomiting to the last. The necropsy showed recent pleuritis and peritonitis, with extensive adhesions; slight pneumonic infiltration of left base; enlargement of the liver, which was alcoholic and friable. In the right lobe were found signs of much bruising and extravasation of blood, but no rupture of the capsule. Spleen and kidneys were normal.

On removing the alimentary canal, a large abscess was found, formed in the pancreas and penetrating the duodenum about eight inches from the pyloric end of the stomach. The pus was thin and creamy, but not nearly so fetid as that vomited. The abscess-cavity was closely matted around with adhesions, and could not be separated from the posterior wall of the abdomen.

Carcinoma.—In the body of a female vagrant, aged 51 years, who had died suddenly during the night, after having tramped several miles during the day, complaining only of pain in one leg, which was swollen, Cane ²_{Dec. 11, '91} found the pancreas enlarged, weighing $7\frac{1}{2}$ ounces (233 grammes) and presenting, macroscopically and microscopically, the appearance of scirrhus. The heart was healthy, but the pulmonary artery was blocked by a large clot. The liver and spleen were enlarged and congested. All the other organs were healthy. Lutz, of St. Louis, ³⁶⁴_{Dec. 11, '91} exhibited a specimen obtained post-mortem from a man aged 40 years, a painter, on whom exploratory abdominal section had been done to determine the nature of an epigastric tumor, apparently pyloric, attended with constant nausea and vomiting. The growth occupied the head of the pancreas, and, in view of its numerous adhesions and the evidences of glandular involvement in the surrounding mesentery, extirpation was not attempted. Amelioration followed the manipulation, but vomiting soon recurred, and blood was now admixed with the material ejected. Death occurred in the course of some five months. A large quantity of blood was found in the stomach and intestine, due to ulceration of the tumor into the duodenum; around the aorta was a mass much larger than the tumor of the pancreas, composed of glands that had become involved secondarily. Sagoet and Lucron ⁷_{No. 20} report a case of primary carcinoma of the head of the pancreas, as large as a cocoa-nut, with obliteration of the duct of Wirsung; compression of the ductus choledochus, which was otherwise permeable; compression of the duodenum, the aorta, the vena cava, and the portal vein; great distension of the gall-bladder, and secondary nodules in the liver. During life, the diagnosis had been obstructive jaundice due to calculi. At one time, cancer of the pancreas was suspected, but as salol was normally decomposed, and the administration of syrup failed to produce glycosuria, the suspicion was erroneously dismissed.

Laennec ¹²⁷_{May 15} presented a specimen of primary carcinoma of the head of the pancreas, without secondary involvement, removed from the body of a male deaf-mute, aged 65 years, who had come under observation about six weeks before death. The symptoms presented were dyspepsia, anorexia, diarrhoea, and profound emaciation. Abdominal palpation discovered a small, hard tumor, tender to pressure, apparently situated at the left angle of the colon (junction of transverse and descending portions). Cachexia appeared and gradually increased, and just before death the left portion of the abdomen became quite œdematous. Sugar was not found in the urine during life.

J. B. Ross, of Victoria, ²⁸⁵_{July 15} reports the case of a boy, 5½ years old, who died after an illness of some three weeks, with symptoms somewhat resembling those of acute yellow atrophy of the liver. On opening the abdomen a small quantity of yellowish fluid escaped; the stomach was found covering the anterior aspect of the liver; the gall-bladder was full and tense; the liver was of normal consistence, 8 by 6 inches in size. The pancreas, especially the head, was hard and enlarged, and firmly adherent to surrounding structures. The kidney was 4 by 2 inches, the spleen 4 by 2½ inches by 1 inch. Three years previously the child had had bleeding from the nose and jaundice, with clayey motions, recovery taking place in a few days. When a baby he could not retain cows' milk, and had to be brought up on artificial food.

Cysts.—Krecke, of Munich, ³⁴_{Nov. 25, 26}; ²_{July 28} gives a summary based on published cases. Traumatism is the only cause established with certainty, but its mode of action is not clear. Some significance must apparently be attributed to gastro-intestinal catarrh spreading to the duct and causing obstruction. The exact position of the tumor depends on the part of the pancreas involved. It is a retroperitoneal, fluctuating tumor, coming forward generally between the stomach and transverse colon, and surrounded in a characteristic fashion by tympanitic resonance. Sometimes it may present above the stomach or below the colon; in the first instance, the dullness would be continuous with that of the liver. Its contents are alkaline, dark brown in color, and possessing the digestive properties of pancreatic fluid. Exploratory puncture is rarely necessary, and is not without risk. The symptoms are chiefly due to pressure; in less degree, to absence of pancreatic

juice. The attacks of colic are, perhaps, due to pressure on the cœliac plexus. Jaundice may be caused by pressure on the common bile-duct. Wasting is common. The duration of pancreatic cysts has been known to be much prolonged. Their size depends on their age. Large cysts may give rise to much difficulty in diagnosis. They must be distinguished from ovarian and renal tumors, from cysts of the mesentery, from hydrops of the gall-bladder, with attacks of colic, as well as from aneurism and deep-seated suppuration. The possibility of pancreatic cyst should be considered whenever a fluctuating tumor is found in the neighborhood of the umbilicus, especially if it has developed after trauma, or follows gastric catarrh. The diagnosis will be certain if it is established that the tumor lies behind the stomach and colon, and severe cardialgia and marked emaciation are observed. The results of treatment by incision and drainage have been good. A fistula occasionally remains, but this may subsequently heal. Out of twenty-seven cases thus treated, all recovered; three died some time later, of diabetes, phthisis, and intestinal obstruction, respectively. Extirpation of the cyst would appear to be accompanied by considerable risk, for, out of six such cases, three died.

Thirolaix and Pasquier,⁷ found, in the body of a woman, aged 93 years, who had during all her life enjoyed excellent general health, and who died comatose about a week after admission for chronic bronchitis with emphysema, a cystic pancreas. Only the tail of the organ had escaped degeneration; the greater part of the gland was transformed into a bosselated tumor about the size of two fists. In the middle there were five or six cysts the size of a hen's egg, and many smaller ones. They did not communicate. The head exhibited in part fatty degeneration, with a number of small cysts; in other parts the parenchyma assumed a spongy or areolar aspect, being studded with innumerable small cavities. The duct of Wirsung was clear; no calculus was found; no evidence of epithelioma. The authors consider the case to be unique.

A case of traumatic cyst of the pancreas is described by Littlewood, of Leeds.² An operation was performed, and forty ounces (1200 grammes) of fluid removed, an analysis of which showed serum, albumen, salts, trypsin, amylopsin, steapsin, and milk-curdling ferment. A case of cystic transformation of the pancreas, in a woman of 74 years, due to obstruction of the common bile-

duct by a gall-stone, is reported by Phulpin, from the service of Rouques.⁷

Hæmorrhage.—Thirolaix reports, from the service of Lanceriaux, a case of sudden death from pancreatic apoplexy.⁷ A gardener, aged 29 years, was admitted in a state of extreme prostration, with pale, anguished countenance, sunken eyes, pinched nose, livid ears and lips, cold skin, icy hands and feet. By gesture he indicated the epigastrium as the seat of intense pain. There was nausea, but no vomiting. Fifteen minutes later, death followed an effort at defæcation. There was no cry or moan. The history was that of apparently vigorous health, until the previous day, which had been one of labor. Two hours after the evening meal, which had been eaten with a good appetite, he shivered, complained of being cold, and went to bed. During the night he was awakened, from time to time, by crises of abdominal and epigastric colic. In the intervals sleep was tranquil, without nightmare. There was nausea, but no vomiting; no diarrhœa; urine copious. At the necropsy, a great black mass, resembling blood-clot, was perceived on lifting the stomach; the hæmorrhage was confined to the pancreas, involving the entire parenchyma. The authors find it difficult to explain the mechanism of the lesion. From a medico-legal point of view, the resemblance of the symptoms to those following epigastric traumatism is not unimportant. Gade³⁶⁹ describes a fatal case of hæmorrhage in an American woman, aged 35 years, who was suddenly taken ill at a Norse railway-station. The omentum was fatty, and the pancreas in part chalky. She was of gouty diathesis, and the kidneys were granular. Cases are reported by Workman,²¹³ and Caven and Oldright.³⁹

Diagnosis of Pancreatic Disease.—Neve,²³⁹ from his experience at the Kashmir Mission Hospital, concludes that the symptoms of disease of the pancreas depend upon (1) alteration of function; (2) anatomical alterations with consequent functional changes in the organs. The first group comprises pain, sensations of weight, tightness, heat or cold, delayed digestion, flatulence, pyrosis, eructations, thirst, anorexia, salivation, diarrhœa or costiveness, with fatty stools. The second group comprises tumor, abdominal pulsation, jaundice, ascites, pigmentation, obstruction of pylorus, duodenum, ascending colon or ureters; enlargement of liver, spleen, parotids; sometimes a special decubitus. In addition

there may be emaciation, anæmia, tendency to faintness, syncope or collapse, hæmatemesis or evidence of internal hæmorrhage, fever and glycosuria.

Fat Necrosis.—Salzer, of Koppelsdorf, ⁸⁹_{Aug. 1}, attributes multiple pancreatic and fat necrosis to a mycotic origin. He has found it in Hungarian and Algerian swine, but not in German swine, except such as had been fed on maize. Curschmann, of Leipzig, found extremely wide-spread fat necrosis in the body of a patient who had died, in less than twenty-four hours, with symptoms giving rise to a diagnosis of cholera. Harrington, of Boston, ⁹⁹_{July 23} observed a case of obliterative inflammation of the gall-bladder, with dilatation of the common and hepatic ducts, and disseminated fat necrosis. The disease was of inflammatory origin, causing general peritonitis, and inflammation of the pancreas could not be affirmed.

Pancreatitis.—A case of suppurative, parenchymatous pancreatitis of microbic origin is reported by Dallemagne. ⁸⁰⁸_{Apr. 30} A woman, 65 years of age, was brought *in extremis* to the hospital, where necropsy showed pulmonary emphysema with hypostatic pneumonia, hypertrophy of the heart, senile atrophy of the kidneys, and slight fatty infiltration of the liver. In some places the pancreas was intact, in others there were hard caseous nodules, passing at various points into areas of suppuration. Bacteriological investigation discovered only one special microbe, which was fatal to rabbits, without, however, causing lesion of the pancreas.

LIVER.

General Considerations.—The asepticity of normal bile has been demonstrated, experimentally, by Mauny, ⁵⁵_{Feb. 13} who, by aseptic traumatism, caused it to enter the peritoneal cavity of animals without producing inflammation. He therefore concludes that the outcome of such accidents in the human being depends upon the previously septic or aseptic condition of the hepatic secretion, which can become septic only through germs introduced from the exterior, as, for example, the digestive tract. Catarrh of the ducts favors such introduction.

The danger of simple operations, in the subjects of chronic hepatic disease, is again forcibly demonstrated by Verneuil, ⁵⁵_{Sept. 17, 81} who reports three cases of death under such circumstances.

The toxicity of the urine, in hepatic disease, has been studied

by Surmont, of Lille.³ It is augmented in atrophic alcoholic cirrhosis, tuberculosis, massive and nodular carcinoma, certain forms of chronic jaundice, and some cases of hypertrophic biliary cirrhosis. It is normal or diminished in hypertrophic alcoholic cirrhosis, in affections secondary to heart-lesions, at certain periods of hypertrophic biliary cirrhosis, and in infectious icterus, whether grave or catarrhal, until the crisis, when it augments. Permanent increase is of grave prognosis, indicating destruction of liver structure and function, and necessitating strict milk diet, with rigorous intestinal antiseptics.

Hepatism is the term proposed by Glenard,²¹¹ to indicate what he regards as the common, and therefore primary or fundamental, factor in a number of morbid states that, when fully developed, present diverse symptomatology. Dyspepsia, neurasthenia, enteroptosis, lithiasis, diabetes, gout, rheumatism, and obesity show the impress of a common point of departure in an inherited failure of hepatic function; the exciting and environing circumstances—alcoholism, influenza, malaria, traumatism, etc.—determining the particular expression. Recognizing the hepatic diathesis before the supervention of grave organic disease, the patient should be placed upon a diet from which starches, fats, and spirits are proscribed; cholagogues, diuretics, and alkalies should be administered; and mechanical means—exercise, massage, hydrotherapy—be adopted to increase the activity of the liver function. Acids or pepsin may be given symptomatically for temporary purposes. Glenard asserts that, in every case of gastric catarrh due to alcoholism, the liver is at least tumefied, and that the gastric affection is best treated by measures suitable to hepatic cirrhosis.

Dujardin-Beaumez⁶⁷ ⁷⁶⁰ maintains that in diabetics the function of the liver is unimpaired, and that cirrhosis and other intercurrent affections diminish or abolish glycosuria. To destroy the hepatic cells in order to diminish glycogenesis would, however, be bad treatment.

Dauchez¹¹⁸ publishes, in tabular form, a series of important comparative measurements, clinical and anatomical, of healthy and diseased livers in eighty-eight children of different ages. The difficulties of exact estimation during life are great. The child should be lying on the left side, the arm lifted, the hand fixed upon the bedstead, the left flank supported and elevated by a pillow.

Exact vertical measurements of limits, determined by palpation and percussion, should be made in the axillary and mammillary lines. Hepatic dullness, anteriorly, is usually one or two centimetres less than the true height of the liver measured in the cadaver. The superior border of the liver corresponds in general with the fifth interspace. In health, the actual extent of the vertical liver-dullness undergoes a slight increase each year, which is appreciable between the second and ninth years, then ceases almost completely until after the twelfth year. Under 8 years of age one, two, or three centimetres added to the number of years of the child's age will approximately give the extent of the normal liver-dullness; after that age the number of centimetres is about equal to the number of years, perhaps a trifle less. In pathological conditions there are three degrees of increase: (1) moderate projection beyond the ribs (catarrhal jaundice, gastric disturbance); (2) decided enlargement (malaria, cardiac disease); (3) great enlargement (amyloid disease, hydatid cyst, syphilis, fatty liver). The difference in size between the normal and pathological liver, in children of the same age, varies from two to four centimetres in mild affections, and from three to ten centimetres in grave organic disease.

Icterus.—Vaughan Harley² publishes an important research that must greatly modify our conception of the pathology of obstructive jaundice. A series of careful experiments was made on dogs. In one series, the common bile-duct and thoracic duct were ligatured simultaneously. In another series, the thoracic duct was ligatured some days after the bile-duct had been obstructed. It was found (1) that, when both ducts were tied at the same time, bile did not appear in the urine for some days; (2) that, when bile had appeared in the urine following ligature of the bile-duct, it disappeared shortly after ligature of the thoracic duct, to return, however, after a variable interval. Careful dissection showed that some time after ligature of the thoracic duct an anastomotic lymph-channel communication with the vena cava was established. Harley therefore concludes (1) that, contrary to accepted pathological doctrine, the bile which is eliminated by the urine and deposited in the skin, in cases of obstructive jaundice, does not find its way into the general circulation through being absorbed by the blood-capillaries; (2) it is the lymphatic system of vessels alone which absorbs the biliary matters in obstructive jaundice, and it is through

the instrumentality of the thoracic duct that they reach the general circulation ; (3) after the thoracic duct has been ligatured for some days, supplementary ducts form by the coalescence of either entirely new or pre-existing, small, collateral lymphatics from the thoracic duct, at a point below the seat of ligature, through which its lymph-stream passes vicariously into the right innominate vein ; (4) that, after the common bile-duct is ligatured, the whole of the constituents of the pent-up bile do not become equally concentrated, the less soluble, such as cholesterin and mucin, being by far the most concentrated ; (5) from the dogs experimented on having, in many cases, not only lived, but even gained in weight, after bile was prevented from finding its way into the duodenum, it may

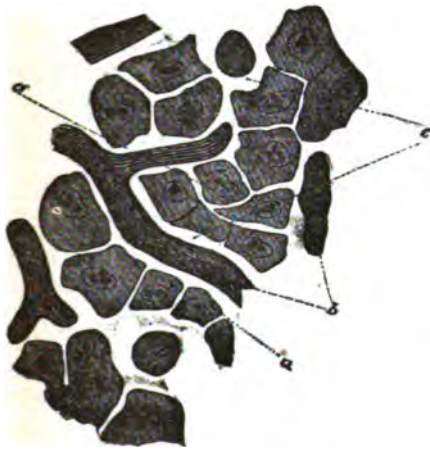


FIG. 1.—PATHOLOGY OF ICTERUS.

Section of the liver of a dog after the common bile and thoracic duct had been ligatured thirty-one days. Injected specimen. *a*, contracted liver-cells, with nuclei, apparently nearer together than in normal ; *c*, a general widening of the spaces between groups of cells (perivascular spaces) in which lie the blood-vessels ; *b*, portal capillaries filled with injection.

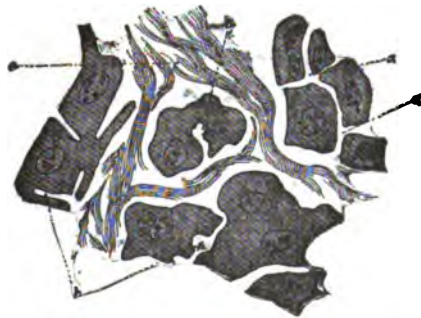


FIG. 2.—PATHOLOGY OF ICTERUS.

Section of dog's liver after both the common bile and the thoracic ducts had been ligatured for twenty days. Uninjected specimen. *a*, small bile-ducts running among the liver-cells ; *b*, bile-canaliculi originating in the hepatic cells ; *c*, reticulated film in perivascular lymph-spaces. The portal capillaries, from not being injected, are not visible.

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be inferred that the admission of bile into the digestive canal is not absolutely essential to life ; (6) that ligaturing the thoracic duct not only prevents the occurrence of obstructive jaundice, after the occlusion of the common bile-duct in dogs, but checks it even after it has set in.

Harley² likewise studied the gross and microscopic changes produced in the liver by experimental obstructive jaundice. The bile-ducts were found to be so enlarged that many of them readily admitted the point of the forefinger, and the bile-capillaries were so greatly increased in size that they were visible to the naked eye, even without the aid of injection. Microscopically, the first

thing that attracted attention was the unusually compressed and atrophied appearance of the hepatic cells. For not only did the cells look as if they had been squeezed together, but all their nuclei seemed to be much nearer to each other than they ought to be (Fig. 1, *a*), just as is seen in cases of advanced nutmeg liver in the human subject, while the spaces between the cells occupied by the portal capillaries appeared to be proportionally widened (Fig. 1, *c*). Moreover, it was distinctly seen in the injected specimens that the separation of the hepatic cells, as well as their compressed appearance, was not due to any enlargement of the blood-vessels (Fig. 1, *b*), but to quite another cause. The injected vessels were seen not to press against the cells at all, but to lie surrounded by a loose net-work of reticular fibres, which, in great part, filled up the space between the hepatic cells; that is to say, the lymph-spaces which normally surround the blood-vessels. These, in fact, were the perivascular lymphatics of MacGillavry and Budge, which had become enlarged by the backward pressure of the pent-up lymph. The effect of the backward pressure of the bile was seen in the small bile-ducts in the interlobular spaces being so widened as to be, in some cases, as large as the corresponding portal veins.

Wm. Hunter²_{14,20} proposes the term *toxæmic jaundice* for those cases of icterus not due to obvious obstruction. He does not consider tenable the view of Affanassiew, that compression of the biliary radicles by surrounding tissues is a partial cause of the obstruction. Contrary to the results of Stadelman, however, he does find a marked catarrh from bile-ducts to duodenum, and by larger doses of toluylenediamin he has produced marked duodenitis. This inflammation extends from above downward, not from below upward. It is produced by a substance excreted with the bile, and Hunter believes that many cases of so-called catarrhal jaundice are of similar origin, beginning as cholangitis from toxæmia. Münzer⁴⁰⁵_{11,12,13} has studied nine cases of infectious icterus (Weil's disease). Uræmia occurred in two cases, one fatal. Hæmorrhages were frequent, especially from the skin and nose. Suppurative otitis media occurred in one case. Recurrence in one instance followed an afebrile period of six days. Croupous pneumonia developed in one case, with fatal ending. In the third fatal case, death was due to the severity of the infection.

Acute Yellow Atrophy.—Yeoman⁶_{14,20} records a case of yellow

atrophy of the liver in a female child aged 10 months, death occurring on the third day after jaundice was first noticed. Hæmorrhages occurred from the skin and from the mucous membrane; vomiting was slight. But one drachm (4 grammes) of urine was obtained. This was of yellow color, with greenish-yellow sediment, and showed play of colors with nitric acid. The pulse was quite variable. Temperature was normal until shortly before death, when it became subnormal. The liver weighed 7 ounces (210 grammes). Sections showed no trace of hepatic tissues, but simply granular, detritus. Microscopic examination of the blood showed the red corpuscles to be granular and irregular, with no tendency to form rouleaux. White cells were greatly increased in number. There were crystals of leucin and tyrosin. No evidence of phosphorus poisoning was found.

Weising, of Würzburg, ¹⁸_{Aug. 15} reports a case that he regards as an instance of favorable termination of acute yellow atrophy, being the sixteenth on record. His patient was a woman, of 26 years, three months pregnant. Progressive diminution in liver-dullness was associated with icterus, vomiting, and general restlessness. After an intercurrent erysipelas, the liver could again be demonstrated by palpation. The patient was nourished for a month by rectal injection of peptone, eggs, and milk. Sir Dyce Duckworth records a fatal case following mental shock, in a woman aged 41 years, which presented some unusual features. The urine was deeply bile-stained, not albuminous, and contained, besides tyrosin-crystals, a fair amount of salts and urea; while, except for the irregular continuance of menstruation, there was no hæmorrhage. The temperature was subnormal until the last two days of life, when it gradually rose from 100.6° F. (38.1° C.) to 102.6° F. (39.3° C.).

McConnell reported ²⁸²_{Apr.} a case which, after three months, terminated by death in coma, and suggests that the term "subacute" is applicable. The patient was a widow, aged 51 years, without syphilitic taint or alcoholic habit, with a history of occasional attacks of bilious indigestion not associated with jaundice. She had had influenza the previous year. The symptoms were: jaundice, headache, pain, vomiting, diarrhœa, ascites, leucin deposits in the urine. At the autopsy, fibrous and atrophic changes were found. In the discussion, Campbell, Lafleur, and others preferred to regard the case as one of atrophic cirrhosis.

Cirrhosis.—De Rechter,⁵² investigating the etiologic power of alcohol, performed a series of careful experiments upon three dogs and ten rabbits, introducing into their stomachs, by tube, a mixture consisting of 96-per-cent. ethylic alcohol, 22.5 parts; amylic alcohol, 2.5 parts; and water, 75 parts. He thus produced interstitial sclerotic changes without alteration of the liver parenchyma. The lesions were perivascular; in the rabbit, affecting the portal spaces, with extensions to the subhepatic veins, tending to dissociate the lobules; in the dog, affecting the subhepatic veins primarily, as, according to Saborin, does alcoholic cirrhosis in man. Hanot³¹ believes that the hepatic cells take active part in the pathology of hypertrophic biliary cirrhosis, being stimulated to excessive secretion (biliary diabetes) by the irritation of obstruction, and that this accounts for the excessive production of new bile-ducts. The affection, beginning in the bile-ducts, must be sharply discriminated from the perivascular form of cirrhosis. Fotheringham, of Toronto,³⁹ reports a case of alcoholic cirrhosis, in a man aged 38, in which the liver weighed 76 ounces (2356 grammes). There was evidence of recent rapid interstitial proliferation; the parenchyma showed atrophy of secretory cells and increase of bile-ducts with marked pigmentation at the periphery of the lobules, in some places plugging the bile-capillaries; and there were portal pyelophlebitis and degenerative changes in the hepatic arterioles.

Cirrhosis and Tuberculosis.—Lafleur²⁸² exhibited a specimen of hypertrophic cirrhosis of the intercellular variety, from a patient who had died of acute miliary tuberculosis. The liver was rough, firm, uniformly enlarged, and of a pale reddish-brown color. On section, yellow spots here and there were found to correspond to unaltered liver-tissue, the rest of the organ being denser and of grayish-yellow tint. Microscopically, the fibrous tissue was not restricted to the periphery of the lobules, but penetrated between the individual cells to the centre of the lobule. Collections of small round-cells, probably indicative of a tuberculous process, were found in many places among the strands of the fully-formed fibrous tissue.

Lafleur, also, had a case presenting only symptoms of obscure lung disease, in which post-mortem there was found atrophic cirrhosis of the liver and chronic bilateral pulmonary tuberculosis.

The atrophic changes involving the portal circulation were attributed to obstruction by a calculus at some earlier period, the common duct and all its branches being enormously dilated. Piliot ⁷⁸_{Jan. 16} reports four cases of tuberculosis of the liver: 1. That of a woman, aged 60 years, with pulmonary tuberculosis and tuberculous peritonitis, in which the liver showed fatty degeneration, and hæmorrhagic tuberculous nodules occupied the portal spaces. 2. That of an infant of 3 months, with general tuberculosis, exhibiting embryonic infiltration in the portal spaces, with formation of nodules surrounded by a peripheric zone of fatty degeneration. 3. That of a young man with acute tuberculosis, exhibiting an acute tuberculous interstitial hepatitis. 4. That of a man of 30 years, exhibiting intestinal ulcerations and tuberculous cirrhosis of the liver, with black pigmentation of the fibrous tissue and general fatty degeneration.

According to Hanot and Gilbert, ⁸_{Feb. 1}, ²⁶_{Mar.} in man, tuberculosis is a cause of cirrhosis of the liver. The liver becomes generally atrophied, indurated, and granular, like the cirrhosis which results from the abuse of alcohol, although in a less degree. More rarely, it becomes deeply furrowed and lobulated as in syphilitic cirrhosis.

Hypertrophic Cirrhosis.—Freyhan ²⁰_{Jan. 11, 1881} details the clinical and anatomical study of four cases of hypertrophic cirrhosis of the liver. He lays down as typical symptoms: (1) an enormous, usually gradual, increase in the size of the liver; (2) intense icterus, while, as a rule, the stools are colored; (3) the absence or insignificance of ascites. Less important, but fairly constant, symptoms are the enlargement of the spleen and the tendency to gastroenteritis of hæmorrhagic type. The temperature is normal or subnormal, with rare evening febrile exacerbations; the pulse is frequent (120 in three out of the four cases). Fever, delirium, sopor, and coma, cholæmic in origin, precede death. The duration of the disease is from about a month to three or four years. Alcohol is a principal etiologic factor. Freyhan does not seem to discriminate sharply between biliary cirrhosis and the hypertrophic form of perivascular cirrhosis.

Several additional cases are recorded. The patient of Meredith, of Danville, Pa., ⁹_{Jan. 1}, was a female aged 69 years, a high liver, with a history of miscarriages, whose father, mother, and one

brother had died of phthisis. Thue's case³⁶⁹_{Am} occurred in a man, aged 34 years, with a history of alcoholism, gonorrhœa, syphilis, and influenza. Calabrese, of Naples, observed, in Capozzi's clinic,⁵⁸⁹_{May} the case of a man, aged 62 years, without morbid heredity, who had, in youth, contracted gonorrhœa and venereal ulcers; but there had been no indication of constitutional syphilis. There had been no malaria or other disease of importance. The patient had used, but not abused, tobacco and alcohol, and had not indulged in sexual excesses. Carson's case,⁵⁸_{May}, Rover's case,⁵⁸_{May}, and Kindred's case,⁵⁹_{Mar. 1} seem instances of cirrhosis with enlargement of the ordinary type. [I have had in my polyclinic service a case of more than two years' duration, apparently of malarial origin, in which the hepatic and splenic enlargement and deep jaundice, without ascites, seem to warrant a diagnosis of biliary hypertrophic cirrhosis; but the patient, a man of about 50 years old, having disappeared from observation, the diagnosis remains clinical only. Pulmonary fibrosis was likewise evident clinically, but tubercle bacilli were not found in the sputum.—Ed.]

Stadelmann³⁴_{May} dissented from his co-referee Rosenstein, and from French authors, that, either clinically or pathologically, could sharp distinction be made between atrophic and hypertrophic cirrhosis. The lesions, said to be characteristic, were frequently commingled. In atrophic cirrhosis, degeneration of hepatic cells predominated. In both forms, hypertrophy of the cells and fatty changes could be found. The atrophic form might begin with a stage of enlargement, while contraction occurs in the hypertrophic form. Both forms are found at all ages; the hypertrophic more frequently in young persons. Ascites is found in both varieties, less often in hypertrophic. Jaundice in both; more frequently in hypertrophic. There may be atrophic cirrhosis with marked jaundice, and hypertrophic without jaundice. The true "biliary cirrhosis," due to occlusion, is a different affection from that so termed by Charcot. The etiology of hypertrophic cirrhosis is the same as that of atrophic cirrhosis, alcohol being the most frequent cause. It may be part of a general fibrosis due to arterio-sclerosis. [It seems to me that there are several forms of cirrhosis, differing in etiology and pathology, and that there is a decided difference between alcoholic perivascular cirrhosis, with enlargement, which may persist or be followed by shrinking, with consecutive atrophy,

and the hypertrophic biliary cirrhosis of the French authors. The atrophy consecutive to shrinking should likewise be distinguished from the primary atrophy with secondary proliferation of connective tissue.—ED.]

Sir Dyce Duckworth² contrasts two cases of painless enlargement of the liver, one of biliary cirrhosis, in a laborer of 45, with jaundice and emaciation and without ascites, and the other in a man, aged 26, who had traveled much in the tropics, who did not present jaundice, who had œdema of the lower extremities, but whose general health was little impaired. Alcoholic cirrhosis, syphilis, and fatty degeneration were excluded, and repeated punctures failed to find evidence of hydatid cyst. The diagnosis of "fibrosis due to chronic engorgement from tropical influences (malaria, heat, indolent life, and good feeding)" was made. Carlier⁸¹ calls attention to the frequency of localized œdema in the course of affections of the liver, and reports two cases of intermittent effusion in the vaginal tunic of the testicles, in subjects of chronic malaria, with enlargement of spleen and liver, and signs of functional cardiac disturbances. [I would be more inclined to affiliate these cases with angio-neurotic œdema of toxic origin.—ED.]

Labadie-Lagrave¹⁷ summarizes the cardio-vascular symptoms observed in cases of hepatic disease. In the order of frequency they are: palpitation and intermittence; secondary lesions of heart and lung; oppression, with or without crises; hæmoptyses, dilatation, especially of the right heart, etc.; crises resembling angina pectoris. He attributes their causation to nervous, reflex, or even ascending neuritis of vagus branches.

The occasional latency of cirrhosis is well shown in a case reported by Dobie, of Madras.⁶ The patient, a melancholic European, aged 40 years, died less than thirty-six hours after he was found unconscious, having passed a tarry stool in bed, melæna and hæmatemesis continuing until death. The stomach and intestines, from end to end, contained fluid blood or clot. The capsule of the liver was adherent to the diaphragm and surrounding organs. The liver was slightly contracted, not hob-nailed, but with increase of fibrous and decrease of hepatic tissue. The spleen was enlarged and fibrous. There had been, previous to the hæmorrhage, no sign of ill-health. Slight pigmentation of the skin had been attributed to exposure to the tropic sun. Franc-

homme ²²⁰_{July}, reports a case of death from hæmorrhage, without previous symptoms, in a girl aged 24 years. The source of the hæmorrhage was a varix of the œsophagus. Specimens from a case in which death was similarly caused were shown by Ewald, ⁶⁹_{May 19}, at the Medical Society of Berlin. This patient, however, a man of 50 years of age, showed signs of advanced cirrhosis of the liver, with great ascites. On aspiration 24 pints (12 litres) of fluid were removed. The patient felt well, but in the afternoon severe hæmatemesis suddenly came on, without pain and nausea; and it was repeated in the evening. Next morning there was collapse, a small pulse and jaundice, and the patient died. The necropsy revealed hepatic cirrhosis, and dilatation and varicose degeneration of the œsophageal veins, which had burst in two places. It was worthy of note that the bleeding came almost immediately after tapping the ascites.

Cirrhosis in Children.—De Giovanni ⁵⁸⁹_{July 1887} has made a study of hepatic cirrhosis in children, and believes that a predisposition exists in the morbid state of the glands, lymphatic system and lymphoid tissues, especially in scrofulous or tuberculous subjects. Stack ¹⁵_{Mar.} has studied the records of 20 cases in children at St. Bartholomew's Hospital and the Hospital for Sick Children, London. The average age was 5 years; 17 were boys and 3 girls. There was no evidence that alcohol or rickets was causative, either indirectly or otherwise. In 7 cases there had been scarlatina, and in 4 or 5 the symptoms dated definitely from that time. Measles is recorded in 6 cases, but without definite relation to symptoms. Seven cases were associated with tubercle in some form, which, except in 2 older cases, was of later date than the liver disease. In 7 cases there was definite acute nephritis. In only 2 cases was jaundice noted, and in neither of these was there nephritis. Ascites was present in all but 3 cases. One case, without ascites, had marked nervous symptoms. The duration of illness was short, averaging five months; in 5 cases it was less than one month.

Two fatal cases of hepatic cirrhosis, occurring in brother and sister, aged 11 and 10 years respectively, without explanation in the family history, are reported by Jollye, of Alresford. ²_{Apr. 28} Measles was the only illness common to both children, and they both drank freely of vinegar. The symptoms were vague and gradual in

onset; hæmatemesis and epistaxis were noteworthy; jaundice was absent in one case and late in the other. Nervous symptoms, including delirium and convulsions, developed, and death occurred from exhaustion or in coma. Tidey, of Montreux, ²_{July 16} in communicating a somewhat similar observation, calls attention to the following points: 1. The sudden incidence of symptoms pointing to grave functional disease of the liver in a boy, who, without being an invalid, had long been ailing and emaciated. 2. The sudden occurrence of ascites without anasarca in a case of apparently non-obstructive jaundice. This feature of the case induced him to alter the diagnosis from that of quasi-acute yellow atrophy of the liver to that of obstructive jaundice due to enlarged glands in the portal fissure. The necropsy showed the jaundice to be due to acute symptoms following on chronic atrophy—that is, on cirrhosis of the liver—and the ascites to be due to enlarged glands in the portal fissure, one enlarged gland in front and one behind the portal vein at the same level, effectually obstructing the flow of blood. 3. Absence of fever. 4. Absence of apparent cause of the disease and death of a brother at the same age (11 years) with similar symptoms.

Treatment of Cirrhosis.—Bristowe ²_{Apr. 28} reported four cases in which treatment was followed by marked improvement. Tapping was done before there was great discomfort or impairment of health. Appropriate tonics and diet were prescribed, and diuretics when necessary. Alcohol was interdicted. The balsam and resin of copaiba, administered internally, are recommended by Gheorgievsky, of Kiev ⁵⁸⁶_{No. 12}; the daily dose varying from $\frac{1}{2}$ to 1 drachm (2 to 4 grammes). The diuretic effects were excellent. Loesch, at the same society, also indorsed the use of the drug. Millard ³_{Mar. 16} had a case of recovery from alcoholic cirrhosis under milk diet, diuretics, purgatives, and potassium iodide. Fremont, of Vichy, ¹⁷_{June 18} reported one case of atrophic and one of hypertrophic alcoholic cirrhosis, cured by dietetic régime and alkaline waters. In the latter case, tapping had likewise been necessary. Rendu ²_{June 1} advocates milk diet and tapping.

Abscess.—A fatal case of multiple abscess, with portal phlebitis, probably originating in ulceration of the appendix, in a boy of 12 years, is reported by Monnier. ⁷_{No. 15} A fatal case of suppurative hepatitis, in a woman aged 52 years, from obstruction in the com-

mon duct by impacted gall-stones, is recorded by McConnell.²⁸² Surgical treatment, proposed and declined, would, probably, have saved life. Generisch⁶²² has reported a case of abscess of the liver in a char-woman, aged 27, who had repeatedly suffered from hepatic colic and jaundice, as well as epigastric pains. A dead ascaris lumbricoides was found in the liver, and the site of a healed perforation was noted between the ductus choledochus and the duodenum. Generisch supposes that the ascaris penetrated into the liver through the duct, carrying streptococci with it, and that this was the cause of the abscess. Magner² reports the fatal case of a man, aged 30 years, whose symptoms were fever, vomiting, and nervous disturbances, in which necropsy showed diffuse suppurative hepatitis, with abscess of the head of the pancreas, and a large abscess in the peritoneal cavity, external to but limited by the liver. The cause was not discovered.

Herrick¹⁹ observed in a woman, aged 23 years, multiple abscess of the liver, probably consecutive to infection from the duodenum by way of a perforation made by a gall-stone. Richards⁶ found a needle imbedded in the left lobe of the liver of an insane woman, aged 52 years, who had inserted it, about twenty days previously, into the submammary region of the left side. There was an abscess at this point, which had discharged during life, and multiple abscess of the liver, which was much enlarged. Whitton, of Reefton, New Zealand,²⁶⁷ reports a fatal case of multiple abscess of the liver, consecutive to intestinal ulceration due to prolonged constipation, in a man aged 50 years. Steel⁹⁰ publishes a fatal case of solitary abscess of the liver, associated with obstructive jaundice from gall-stone, in a man aged 34 years. Heller³⁴ exhibited a large abscess of the liver, due to dysenteric ulceration, in a merchant, aged 48 years, from Cairo. Fontan, of Toulon,³ recorded three cases; in one methodic curettage produced recovery; in a second case, while death occurred from pneumothorax, the good effect of the curettage was shown locally. A case of suppurative cholangitis, associated with hepatic and general tuberculosis, in a girl aged 8 years, is reported by Pépin.¹⁸⁸ Various bacteria, pyogenic and non-pyogenic, were found in the abscess. The author attributes the tuberculosis and the abscess formation to the same cause. A. Fraenkel⁶⁹ communicated the case of a man, aged 29 years, in whom hepatic abscess followed a third attack of peri-

typhlitis, and who recovered under surgical treatment. The same observer exhibited the liver of a woman, aged 69 years, showing solitary abscess consecutive to obstruction of the common duct by gall-stone. Dabney⁵_{Aug. ; Aug. 13} believes that hepatic abscess rarely occurs as a result of injuries or diseases of the bones or other parts of the body, except those directly connected with the portal system of veins or immediately adjacent to the liver. Ulceration of the bowel is a common cause. Abscesses originating in the bile-ducts and those due to injuries of the liver itself, which usually appear in a few days, seem to be of comparatively rare occurrence. Abscesses occurring in connection with general septicæmia or pyæmia are, probably, nearly always multiple and small.

Dymott, of Madras,²_{Feb. 13} has had five recoveries, in eight operations for tropical abscess, the presence of pus having been ascertained by exploration with a large sterilized needle. McLeod, of Shanghai,²_{Dec. 21, '91} reports seven cases operated upon. Two were instances of multiple abscess consecutive to dysentery, and proved fatal. Of the others, three recovered. The author would not operate upon cases of multiple abscess if sure of the condition. Of the solitary abscesses, three followed dysentery, and two of these recovered. Bianu²⁵⁹_{Nov. 15, '91} reports a case of hepatic abscess, in a man aged 22 years, in which recovery followed operation. Arnaud, of Marseilles,⁴⁶_{Nov. 15, '91} saw four cases of hepatic abscess in a few months. Boinet⁴⁶_{July 15} has studied abscess of the liver at Tonkin. It is frequent, especially as a sequela of dysentery, but is often unsuspected during life. Prompt surgical treatment is necessary. Failure is often due to temporizing. After exploration with a sterilized needle, incision is made, with the needle as a guide, as freely as the indications may suggest. Costal resection may be required. Among his cases was one of spontaneous evacuation into the colon, with recovery.

Gall-Stones.—Of fifty consecutive necropsies, at the female department of Colney Hatch Asylum for the Insane, Beadles¹⁶⁶_{July} found gall-stones in eighteen cases, or 36 per cent. In no case had there been symptoms pointing to gall-stones. Half the bodies were markedly emaciated, and only three were abnormally stout. He calls attention to the fact that cholesterin, which enters so largely into the formation of gall-stones, is an important constituent of nervous tissue.

In a case under the care of D. Stead, of Birmingham,² a man, aged 62 years, passed, by the rectum, a gall-stone weighing 309 grains, (20.6 grammes) without presenting icterus or the ordinary symptoms of hepatic colic, and without relief to obstinate constipation. There had been aching pain in the right side, for which physical examination failed to discover a cause, and the patient was weak and emaciated. It is supposed that the stone entered the bowel, by ulceration, through the wall of the gall-bladder. Williams,¹⁰⁴ of Baltimore, reports the case of a woman, of 72 years, with pain, diarrhoea, and fæcal vomiting, and a well-defined tumor in the ileo-cæcal region, who recovered, after the passage by the bowel of an enormous gall-stone.

Meachem, of Racine, Wis.,²¹⁰⁵ records the case of a nun, in whom, after subsidence of a febrile attack, associated with pain, tenderness, and swelling in the right hypochondrium, a second attack resulted in the formation of a fluctuating tumor, which was incised, giving exit to pus and a few small gall-stones. After dilatation of the fistulous track by elm tents, 136 gall-stones found their way out, during a number of weeks. Davidson, of Sydney,²⁶⁷ reports a case of ulceration of gall-stones, through the umbilicus, in a woman aged 32 years. For four years she had been troubled with a discharge from a small opening in the navel, and a small swelling appeared and disappeared. Pain and inflammation preceded the discharge of the stones. Recovery was prompt. Kirmisson and Rochard³⁶⁰ have analyzed 105 cases of intestinal obstruction, by gall-stones, with a mortality of 50 per cent. There is rarely a history of jaundice, or biliary colic, and fæcal vomiting is common. The course is sometimes acute, but more often chronic. The stone is most frequently arrested in the small intestine.

Graham, of Toronto,³⁹ records a case of death from intestinal hæmorrhage, preceded by gradual exhaustion, in a woman aged 76 years, in whom the liver was fatty and the gall-bladder completely filled with calculi. The patient ate large quantities of bread, potatoes, and sweets, and had latterly taken but little exercise.

Pauly, of Lyons,²¹¹ reports the case of a woman, aged 47 years, who died suddenly in collapse, preceded by agonizing pain, while under treatment for hepatic colic. There was found in the abdomen a blood-clot weighing 600 grammes (20 ounces), and some sanguinolent liquid.

Kelly, of Dumka, India,²⁸⁹ reports the case of a dissipated prisoner, aged 35 years, who died in a convulsion, after some hours of agony, the day following a complaint of heaviness in the epigastrium. There was no jaundice. The liver was enlarged and pale; the gall-bladder contained 1½ ounces (45 grammes) of viscid bile and seventy-eight gall-stones, of which five measured more than one and one-half inches in circumference. The duct was inflamed, but did not contain a calculus. There was local peritonitis. The heart contained clots in both cavities. Death is attributed to syncope from continued excruciating pain.

Girode³ reported the case of a man, aged 48 years, who died in apyretic collapse, some three months after admission with symptoms of progressive icterus, bilious vomiting, and albuminuria, associated with induration of somewhat indefinite limit in the pyloric region. The gall-bladder contained a large calculus, and was enveloped in a fibrous inflammatory mass which extended to the colon, the duodenum, and the head of the pancreas, with the common and communicating ducts. A case with similarly extensive adhesions, but without suppuration, occurring in a woman aged 54 years, is reported by C. B. Storrs, of Detroit.³³⁹

Leva⁶⁹ describes two cases observed by him, in which ulcerative endocarditis seemed to be the result of preceding cholelithiasis. He feels justified in assuming a close connection between the changes in the bile-ducts and the inflammation of the cardiac valves. Rendu²¹² calls attention to the difficulties of diagnosis in cases of cholelithiasis presenting an incomplete or misleading symptomatology. Hepatic colic may be replaced by gastralgia, vague epigastric discomfort, or simple drowsiness, that may be attributed to dyspepsia or to uterine reflex. The discrimination depends upon the predominance of pain over symptoms of deranged secretion, the absence of vomiting, water-brash or eructation, the want of relation between the attacks and the quantity or quality of food taken, and the fact that the pain nearly always occurs two or three hours after meals. On the other hand, the severity and persistence of the pain may be misleading, as illustrated by a case in which relief finally followed expulsion of a large calculus after an intestinal hæmorrhage. Pain may be seated elsewhere than in the abdomen; in the case of a patient with migraine, the passage of a calculus always

excited headache; but its duration and character enabled the patient to discriminate the hepatic cephalalgia from that of migraine. In other cases there is no painful paroxysm, but various nervous disturbances are noted, especially melancholia and depression. In still other cases the symptoms are merely chlorotic. Fürbringer³⁴ cites four cases, resembling hepatic colic, in which concretions were passed that were called gall-stones, but proved to be made up of fruit-seeds. Two cases were purely nervous hepatic neuralgia. In such cases the greatest intensity of pain is over the liver region. The patients are, as a rule, youthful, anæmic, neurasthenic, or hysterical. The attacks frequently show a periodicity. The patellar reflex is often exaggerated. Other visceral neuralgias may co-exist.

Papers on the use of olive-oil in the treatment of hepatic colic, contributed by Goodhart,² Égasse,⁶⁷ and Swiderski,^{788 100} show that the practice is becoming wide-spread. Morrison, of Oxford, N. S.,²⁸⁴ found the hypodermatic injection of pilocarpine a useful adjuvant in the treatment of an obstinate case. Griffin, of Illawara, La., being unable to get oil that was not rancid, gave melted fresh butter, in doses of two tablespoonfuls, every two hours for twelve hours, followed by castor-oil. Hot cloths were applied over the abdomen, and fluid extract of dioscorea villosa was likewise administered. Relief was prompt, and several calculi were found in the stools.

Glycerin is employed by Ferrand,³ who states that, in doses of 20 to 30 grammes (5 to 8 drachms), in cherry-laurel water, with an equal quantity of chloroform water, it will determine the end of the crisis; and in doses of from 5 to 15 grammes (1½ to 4 drachms), in a little alkaline water, every morning, it will prevent new attacks.

Dujardin-Beaumetz⁸⁰ abandons the prohibition of fatty and carbohydrate foods, and emphasizes the proscription of irritating ingesta, counseling a diet of eggs, starches, green vegetables, and fruit. Salol and bismuth salicylate may be given in cachet, with sodium bicarbonate (10 grammes—2½ drachms—of each, in thirty wafers). Laxatives, such as podophyllin, cascara, and sodium-sulphate waters, may also be used. Large rectal injections, which may contain an antiseptic like naphthol, are likewise useful. Deep, full inspirations, which necessitate abandonment of corsets and

waist-bands, help to promote the flow of bile by compressing the gall-bladder. Long walks and other bodily exercises are also to be advised. Abdominal massage and hydrotherapy are useful. In the treatment of the paroxysms of hepatic colic, atropine sulphate (0.0005 gramme— $\frac{1}{128}$ grain) and morphine sulphate (0.005 gramme— $\frac{1}{20}$ grain), in water, may be given subcutaneously, and olive-oil, to which ox-gall is added (20 to 100), is given, in one dose of 200 grammes (6 $\frac{1}{2}$ ounces), or about a tumblerful, the mouth being afterward rinsed with brandy and water. Cholecystotomy or cholecystectomy should be performed, in cases not amenable to medicinal measures, and presenting symptoms of sufficient gravity.

Echinococci.—J. B. Ross²⁸⁵_{July 15} describes the case of a woman, aged 28 years, in which the presence of a hydatid cyst gave rise to symptoms interpreted as those of cholelithiasis. There were repeated attacks of colic, followed by jaundice, fever, and vomiting. Operation was unsuccessful in finding the cyst. Small daughter-cysts were passed by the bowel. Improvement was only temporary, and death took place after rigors and symptoms of concealed suppuration. Necropsy was not made. The case illustrates, perhaps, Leyden's statement, in discussion of Klemperer's case, at the Berlin Medical Society,⁶⁹_{May 12} that suppuration in a cyst, that has partly discharged its contents through the gall-ducts, is facilitated by aspiration of pyogenic organisms from the intestine, and that abscesses caused by hydatids often contain a large quantity of hematoidin, giving an ochreish color to the pus. In Klemperer's case, however, this sign failed. A similar case, with infection of the peritoneum, was reported by Eisenlohr.⁶⁹_{Nov. 19, '91} Bruce and Shield,²_{Feb. 11} report a case of gelatiniform degeneration of a hydatid cyst of the liver in a man aged 40. Aspiration was unsuccessfully attempted, the tough, jelly-like material blocking the cannula. Hepatotomy was then undertaken, and, while recovery from this was good, the patient died eight days later, with all the ordinary symptoms of delirium tremens.

Mori⁴⁹⁷_{Nov., '91} observed suppuration of a hydatid cyst in the course of typhoid fever of indubitable diagnosis. The pus did not contain Eberth's bacillus, but the ordinary pyogenic cocci. Huber⁸²⁸_{Dec. 10, '94} reports a case of multilocular hydatid cyst of the gall-bladder in a man, aged 64 years, who had had much to do with dogs, and who

died from exhaustion after an attack of irregular remittent fever, associated with jaundice, colic, and diarrhœa. The liver was not palpable during life, and throughout the case the area of hepatic percussion dullness was not increased.

G. Bacelli⁵⁰⁵_{June 20},³¹_{Sept. 4} has communicated an additional case of successful treatment of hydatid cyst of the liver by aspiration—with removal of thirty centimetres of fluid—and injection of a solution of mercuric chloride (1 to 1000). Gil⁴⁹⁴_{Dec. 15, '78} successfully treated, by gradual aspiration, followed by compression, a large hydatid cyst in a man aged 30 years. There was no fremitus, and the diagnosis, as against carcinoma, could only be made by puncture.

Syphilis.—Collinet⁷_{Jan. 1, '11} showed a liver from a woman, aged 68 years, exhibiting furrows, cicatricial depressions, gummata, and interstitial hepatitis. The kidneys and spleen were amyloid. Interstitial nephritis and cerebral gummata were likewise present. Caumen¹⁸⁸_{June 27} exhibited a liver showing perihepatitis with adhesions, pericellular fibrosis, and depressed cicatrices, the results of syphilis. Daly²_{Aug. 27} reports a case of jaundice and ascites, associated with the presence of a chancre, in a boy aged 18 years, in which recovery took place under antisiphilitic treatment. Salomone⁵³¹_{Feb.},²⁴_{July 10} points out that early syphilitic jaundice indicates feeble resistance, and is thus of prognostic import. Hector Mackenzie²_{Nov. 1, '78} showed a liver from a poorly-nourished boy, aged 15 years, which was scarred and exhibited hypertrophic cirrhosis, the connective tissue running into the lobules and between the cells. It contained gummata. Pitte reported a similar case in a boy, aged 16 years, the subject of congenital syphilis. Mollison²⁸⁵_{Mar. 15} exhibited a specimen of syphilitic fibrosis of the liver from a child, aged 2 years, who died shortly after a severe convulsion. Walter Smith¹⁶_{Aug.} exhibited the viscera taken from a man, aged 63 years, who died of uræmia. Nine years previously he had contracted chancre. Gummata were found in the liver and spleen, and amyloid changes in the liver, spleen, and kidneys. E. Wills¹⁸⁷_{July} reports a case of amyloid disease of the liver, associated with similar changes in the kidney and spleen, in a man, aged 22 years, admitted to the Rainhill Asylum for dementia. Uræmia was the immediate cause of death. No focus of suppuration was found in the body. The liver was small, dense, thickened; the capsule was thickened and bands of connective

tissue extended into the parenchyma, constricting it into lobules. Congenital syphilis is offered as the explanation. Kalenduru²⁵⁹_{Feb., Mar.} contributes clinical lectures on hepatic syphilis.

Tuberculosis of the Bile-Ducts.—A. H. Pilliet¹⁶⁴_{Jan., 14, 21} anatomically and experimentally concludes that biliary tuberculosis, in all its forms, from the small granulation tinted with bile to the true cavity, is an ulcerative process, the infective agent being carried by the excretory channels; that it differs anatomically from that most common form of tuberculosis of the liver, in which the infection is carried by the blood-current; and that a complete analogy exists between this form of tuberculosis and that observed in the lung.

Angeioma.—H. T. Hanks¹_{Jan., 11} related the history of a case in which he had made an exploratory incision into a tumor of uncertain nature, evidently proceeding from the lower lobe of the liver. The incision revealed what seemed to be a cancerous growth of the entire lower lobe, extending far beyond the median line and down to the pelvis. The line of demarkation between healthy and diseased tissue was distinct, but, as nothing could be done, the wound was closed and the patient allowed to recover from the operation. Electrolytic puncture was performed twice, but the patient seemed not to endure it well; so that percutaneous application of the current, with compression with sponges, was substituted. Several months after the exploration, the patient was in better health and was able to go about and do her work, the tumor having lessened in size about two-thirds. Edebohls was able to report recovery in such a case, where he had instituted no electrical treatment. He thought that the compression of the liver in Hanks's case might have had something to do with the improvement.

Actinomyces of Liver and Lungs.—Brigidi⁵⁰⁵_{Aug., 11; Sept., 10} records a case of actinomyces in which the disease occurred primarily in the liver, and became disseminated through the lungs, giving rise to clinical signs and to macroscopic appearances, which could hardly be distinguished from disseminated tuberculosis. The disease had extended to the adjacent part of the supra-renal capsule, a part which has not been before recognized as affected with actinomycosis.

Sarcoma.—Gaston Wach⁷_{Nov., 21} had a case of sarcoma of the liver, mistaken during life for hydatid cyst, in a girl aged 22 years. Litten⁶⁹_{Mar., 1} exhibited a specimen of melanotic sarcoma, from a man, aged 41 years, who had first been compelled to give up his arduous

work as a letter-carrier, by an attack of influenza, but three and a half weeks before death. The enlargement of the liver being noted, the diagnosis was made by the history of enucleation of the eye for sarcoma of the choroid. The urine was not altered in appearance, and did not contain melanin. During life, marked friction-rub was palpable and audible over the whole liver. The organ weighed 22 German pounds (11 kilogrammes), and had so compressed the ureter as to cause hydronephrosis. It contained both melanotic and unpigmented nodules. The spleen was much enlarged, but metastasis was not found, except in the foetal glands.

Carcinoma.—Crocq²⁶⁸_{Ma.7, Apr.} reports a third example of latent carcinoma, discovered at necropsy upon an aged woman, and involving liver, gall-bladder, and pancreas. Death had apparently been due to senility; the only symptom was progressive weakness, and the appetite had remained good. Little²_{Apr.28} presented a carcinomatous liver, of the brain-like variety, weighing 178 ounces (5340 grammes), taken from the body of a man, aged 48 years, the whole duration of whose illness had been only four months. The early symptoms were those of gastric disturbance, anorexia, dryness of the mouth, water-brash, regurgitation of food; to which drowsiness and constipation were added, and, about one month before death, jaundice, followed by ascites. Cancerous nodules were found in the lesser omentum, mediastinal glands, and both lungs, and what appeared to be the primary growth was in the rectum. Although hard to the touch, like scirrhus, the microscopic structure was that of adeno-carcinoma. A specimen of primary carcinoma of the liver, with secondary growths in the orbit, taken from the body of a child of 5 years, is described by W. C. Pierce and J. P. Pyle.¹⁹⁸_{July} The paternal great-grandfather and maternal grandmother had died of cancer of the stomach; the mother's uncle of phthisis. The duration of illness was two years, and the first symptoms of pain and abdominal enlargement followed contusion of the epigastric region by a fall. The diagnosis of carcinoma was confirmed by microscopic examination. Garlock, of Little Falls,²⁰⁶⁵_{p.308} reports a case of nodular multiple carcinoma of the liver, associated with biliary and renal calculi, in which he failed to find a source of infection elsewhere. The patient was a woman, aged 56 years, with long-standing dyspepsia

and anæmia. Enlargement of the liver was first noted about four months before death. Pain was never intense.

Primary Carcinoma of the Gall-Bladder.—A case in connection with cholelithiasis is reported by Collinet, from the service of Huchard, ⁷_{July}, and one from that of Martin. ⁷_{July}. In the first case, that of a man aged 71 years, there were secondary nodules of cylindrical epithelioma in the liver, and a fibroma in the mesentery, showing epitheliomatous invasion. The growth in the gall-bladder was alveolar. The second case was that of a woman aged 54 years. The primary growth had origin in the epithelial layer of the mucous membrane, unlike the preceding case, which began in the glandular *cul-de-sacs*. Secondary deposits were found in the liver, which had previously undergone sclerotic changes from alcoholism. Propagation had likewise taken place in the diaphragmatic peritoneum and mesentery, and a growth, that might have been primary or secondary, was found in one of the ovaries.

Primary carcinoma of the ductus choledochus, in a man aged 67 years, is reported by F. May, of Munich. ³⁴_{Aug. 16}. Large numbers of calculi were found in the gall-bladder and the cystic and common ducts. The latter was greatly dilated, and at its mouth in the duodenum was found a hard, annular mass, larger than a cherry, which, on microscopic study, proved to be cylindrical epithelioma. Numerous small metastatic nodules were found in the liver. In addition, there was necrotic inflammation of the gall-bladder, with perforation into the peritoneal cavity, purulent peritonitis having been the immediate cause of death.

G. T. Murrell ²²_{Feb.} reports a case from Garrod's service, in which death took place from carcinoma of the liver in a woman, aged 60 years, from whom, twelve years previously, a scirrhous of the breast had been removed. Seven years after this operation, nodules were removed from the scar, and subsequently two similar operations were necessary. Oedema of the legs, followed by jaundice with abdominal pain and swelling, occurred about two months before death.

Adenoma.—Buchanan, of Glasgow, ²¹⁸_{Aug.} showed a specimen of this rare form of tumor. On making a transverse section of the liver, a pulpy, greenish-yellow, necrosed mass was discovered within the right lobe. It was surrounded by a distinct capsule,

and involved the lobe to such an extent that only a thin rind or margin of proper hepatic tissue remained. The left lobe and the remains of the right were studded with small, yellowish-brown, well-defined nodules, varying in diameter from less than a sixteenth to about a quarter of an inch. These nodules gave to the surface of the liver an appearance suggestive of cirrhosis.

Dufournier⁷ reported a case of Laennec's atrophic cirrhosis, of rapid development, accompanied with icterus, and associated with adenoma of the liver, occurring in a male, aged 62 years, admitted to hospital semi-comatose, and with extensive œdema and ascites. The spleen was enlarged and diffuent, the kidneys enlarged and congested. The liver weighed 1850 grammes (3½ pounds); it conserved its normal form, and presented a general greenish coloration. There was no perihepatitis.

Darier⁷ has observed adenomata: 1. Post-mortem, in subjects affected with atrophic cirrhosis or rarer disease. 2. In subjects presenting a cirrhosis of extremely rapid progress; persistent icterus and enlargement of the liver being added to the ordinary symptoms. 3. In cases the symptoms of which do not resemble those of cirrhosis, but of neoplasm. At the outset one is inclined to diagnosticate hydatid cyst, but, as the cachexia becomes more pronounced, carcinoma is suspected. For the third variety he proposes the name of "primary cancer with cirrhosis." He reports an instance in a male aged 51 years. There was no history of impaludism, of syphilis, or of alcoholic excess.

CHOLERA ; DISEASES OF THE INTESTINES AND PERITONEUM.

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THE department of intestinal diseases, this year, is of great interest because of the cholera epidemic which broke out in several parts of the world in 1892. A large number of articles upon this subject immediately followed, and we have given them all the necessary space. However, the study of other intestinal affections has not been neglected, some most interesting researches having been made.

CHOLERA.

Europe has seen raging, during 1892, an epidemic of cholera, with a violence sufficient to claim numerous victims. This epidemic, coming from Asia like those preceding it, followed a land route, first invading Russia, and then turned toward the West. It has been the occasion of numerous articles, all very interesting. An entire volume of the ANNUAL would not suffice to make a summary of all of them. We will consider only the most important in order to give a general idea of the subject, and to show, at the same time, the results obtained and the results yet to be accomplished in the knowledge of this disease.

History and Epidemiology.—Harvey,^{1,2} at the Congress of the British Medical Association, at Nottingham, gave the history of the cholera epidemic of Srinagar, in Kashmir. After describing the deplorable sanitary condition of that country, where every hygienic innovation is regarded as an oppressive measure, the author showed how the epidemic, which raged in the district of Rawal Prudi for some time afterward, reached Marri, then Garial and Bagla, and, finally, Srinagar on May 6th. The total number of cases quoted was 8928, with a mortality of 5736,—a considerable

proportion, considering the population of Srinagar, which is about 124,000 souls. Harvey describes the measures adopted for nursing the patients and stamping out the epidemic.

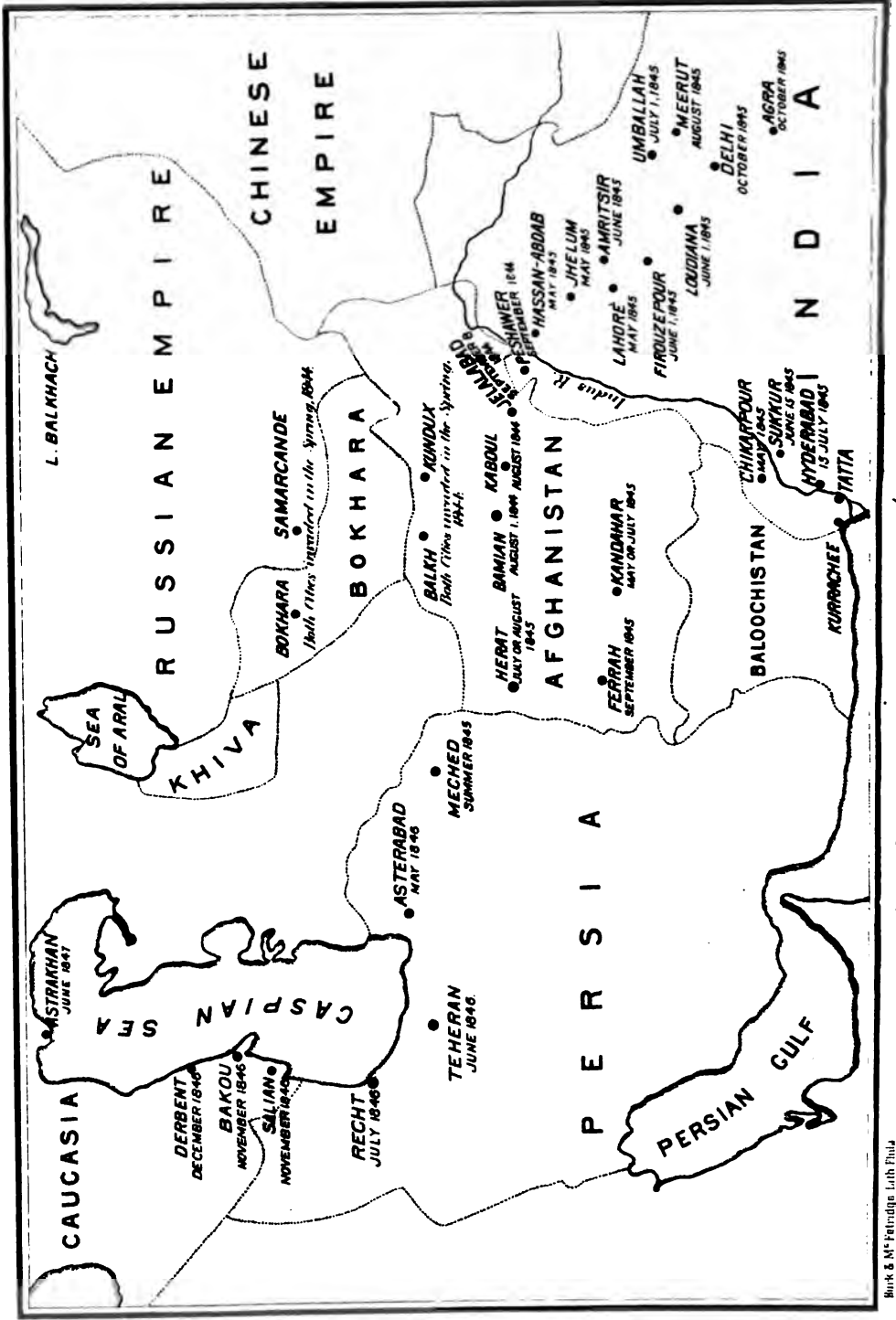
Proust, of Paris,²¹⁴⁰ has carefully studied the progress of the various epidemics of cholera, and the choleraic agent, from an experimental point of view, to show the transmissibility of cholera. Physicians and those who interest themselves in hygiene will find much information in this work. Proust gives the following figures on the cholera at Hamburg, from August 20 to October 8, 1892²¹⁴¹ Oct. 17.—

Dates.	Cases.	Deaths.
First week,	8778	1817
Second "	6378	3013
Third "	3962	1548
Fourth "	2893	923
Fifth "	1327	547
Sixth "	474	180
Seventh " October 2,	82	9
" " " 3,	89	7
" " " 4,	30	12
" " " 5,	21	6
" " " 6,	19	4
" " " 7,	10	3
" " " 8,	4	2

At this date the epidemic might be considered as ended. There had been 17,862 cases and 7571 deaths.

Monod, of Paris,²¹⁴¹ Oct. 17 gives the following results of the epidemic in France, from April 4th to October 15th, divided by months: April, 65 deaths; May, 28; June, 107; July, 466; August, 841; September, 1411; from October 1st to 15th, 266. This makes a total of 3184 deaths in the 212 communes attacked. The epidemic of 1884-5 had invaded 639 communes, and had caused 11,865 deaths. The difference between the two epidemics must be attributed to the perfecting of the present means of disinfection.

Drasche, of Vienna, showed, at the actual time of the epidemic, that wherever the private and public sanitary and hygienic conditions corresponded to scientific requirements, the disease had been less grave and more localized than in preceding epidemics. In tracing the history of these various epidemics, he calls attention to the fact that the city of Vienna had been exempt from cholera for nineteen years, the longest interval observed between two epidemics. While in the epidemics of 1831-2 the mortality ranged from 10



Cholera Pandemic of 1816-1819. (Tholozan.)

Burk & M^cPartridge Lith Thua

to 13 per 1000 inhabitants, in the epidemics of 1866 and of 1873 it was only 7 per 1000. The excellent sanitary condition of Vienna is evidently due to the good quality of its drinking-water, and to the hygienic improvements in force there. While approving, in a general way, of the sanitary measures of choleraic prophylaxis, the author declares himself an enemy to quarantines, which, he thinks, may become veritable epidemic centres.

Tholozan, of Teheran,⁹²⁰ has sought to determine the countries in which the second choleraic pandemic began, the one which, after traversing Persia, invaded Europe and America in 1847, 1848, and 1849. The author shows that the emerging points of choleraic epidemics should be considered as the centres of origin. The idea that the different pandemic manifestations of cholera come direct from India can no longer hold ground. In Europe alone there were two striking examples in 1852 and 1859 to contradict this theory, which only recognized danger by contamination through the products of the East. The epidemic of 1852 came from the confines of Poland and Germany, its point of departure, as the epidemic of 1869-73, being at Ukraine.

To-day, when these facts have been proved by science, there is still an effort to lessen their importance by the statement that these epidemics are the outcome of previous epidemics in India,—the revival of the cholera germ, with all its primitive attributes. This revival is equivalent to a veritable outbreak, since, even in India, these seeming revivals perpetuate the annual endemics and the epidemics which occur every three, four, or five years.

This is the chief and primordial fact, dominating the whole history of the cholera, and upon which micro-biological researches should be brought to bear. What difference is there in the morphology, virulence, or faculty of reproduction between the germs of epidemics extinguished on the spot, epidemics which sometimes break out afresh everywhere, and which may invade the entire world, although they do not start from India?

Ali, of Teheran,¹⁰ has made a communication on the origin and progress of Asiatic epidemic cholera. Historical works, Arabian and Persian, as well as poetry and literary works, prove that cholera existed long before this century, and that, from the Middle Ages, it made great ravages. It seems possible to affirm the identity of an actual epidemic with the epidemic affections of the

Middle Ages, as it is not possible to confound cholera *Plague* which raged then,—“Cholera Weba,—la peste T

Since 1847 we know that all cholera epidemics have come from India, starting from the borders of the Ganges, and spreading themselves afterward, either by land or by sea, forming and there, so many momentary, secondary centres. Observations made in all countries, notably in the East, demonstrate clearly that quarantines might be really useful if we knew the length of the period of incubation; but this is very variable. It has been observed that travelers having suffered a long quarantine are not attacked with cholera until several weeks after leaving quarantine, while others, under similar circumstances, die on their arrival at the lazaretto. The only procedure which appears to Ali to be efficacious is thorough disinfection of localities occupied by patients, those dead from the disease, as well as of objects touched by patients,—linen and clothing.

Bacteriology, Anatomy, and Pathology.—Roger, of Paris, describes a case of septicæmia following cholera, in a patient who, after an attack of cholera, died with meningeal symptoms. The autopsy revealed no appreciable lesion; but inoculations from the liver and the cephalo-rachidian fluid gave pure cultures of a small, mobile bacillus, ovular, with rounded extremities, fixing and coloring colors fairly well, and decolorizing by Gram's method. The various characteristics of this bacillus resemble those of *proteus vulgaris*; but it is distinguished from the latter in certain ways, and cannot be confounded with it. Roger proposes to give it the name of *bacillus septicus putridus*, which sums up its chief properties. Inoculated into animals, the bacillus produces death from six to seven days. In every case the autopsy showed no appreciable lesion; it was, in fact, a real septicæmia. Hoppe-Seyler, of Berlin, ⁴ has examined, clinically, the urine of several cholera patients, also of two subjects affected by cholera nostras. In the cases of Asiatic cholera the urine continually contained a large proportion of indoseyl, chiefly after the algid stage; the elimination of indoseyl being completed at the end of several days, at the same time that the urinary secretion increased. In the cases of cholera nostras, as well as in Asiatic cholera, the proportion of ether-sulphuric acid contained in the urine was increased in varying degrees.



Kirchner,⁴ has made some bacteriological researches in cholera nostras and Asiatic cholera. In five cases of the latter, inoculation produced the comma bacillus in more or less pure cultures. The author insists on the fact that, in a patient who succumbed on the tenth day of his illness, the small intestine contained only rarely specimens of the comma bacillus, side by side with numerous bacilli coli communis, while from the time of his entrance into the hospital his dejections gave pure cultures of the comma bacillus. In none of the sixteen cases of cholera nostras was the vibrio of Finkler and Prior found. In the patients' dejections the bacilli coli communis, with other saprophytes, were constantly present.

Increased Action of the Virus.—Haffkine, of Paris,²⁷ has reported the results of his very interesting experiments on the attenuation of cholera virus and the vaccination of animals. He finds that an augmentation is produced by continuous passage from animal to animal: (1) by injecting into the peritoneal cavity of the first animal a dose, several times deadly, of virus taken from the surface of a gelatin culture; (2) by leaving this effusion exposed for several hours to the contact of air at the ordinary temperature, and (3) afterward inoculating with it several other animals. A series of continuous inoculations will lead to a fixed condition of the virus,—that is to say, the culture made with the microbe kills the animals in the same dosage and in the same time.

Intra-muscular and Subcutaneous Inoculation.—Animals inoculated with this strong virus in the depth of the muscles die. Introduced into the cellular subcutaneous tissue, it produces extensive œdema, ending in mortification of the tissues, but the general state of the animal remains unimpaired.

Attenuation of the Virus.—The virus has been weakened so far as to take away its mortifying power on the cellular tissue by cultivating it at a temperature of 89° C. (192.2° F.) in an atmosphere constantly aerated. Under these conditions the vibrio rapidly perishes. In order to prolong the experiment for a sufficient time to attenuate it, the microbe is re-inoculated in a new culture medium every two or three days.

Vaccination Against Cholera.—A previous inoculation of this weakened virus in guinea-pigs afterward allows of the introduction

of the strongest virus under the animal's skin, without producing the least sign of mortification. An animal, having submitted to these two preventive inoculations, is preserved against all cholera infection, in whatever manner, including the direct introduction of the microbes into the intestines, after previous injection of opium into the peritoneal cavity. Haffkine has applied the same procedures of augmentation and of vaccination to rabbits and to pigeons, with the same success. Finally, in a last series of experiments, he inoculated himself with a certain dose of his anti-cholera vaccine, and has thus been able to establish its innocuousness in man, the efficacy of which appears to be certain in the animals experimented on.

Ketscher, of St. Petersburg,⁹²⁷ has presented a paper on the immunity conferred by the milk of vaccinated goats, 5 cubic centimetres ($1\frac{1}{2}$ drachms) protecting 11 guinea-pigs against a mortal dose of cholera ($1\frac{1}{2}$ cubic centimetres—8 minims) injected into the peritoneum. The guinea-pigs to which the milk was given continued in good health, while those which were inoculated with the virus succumbed in six or ten hours. The milk of non-vaccinated goats possesses no immunity. That of vaccinated goats has also a curative power. If a deadly dose of cholera be injected into the muscles or into the peritoneum of guinea-pigs, and they be afterward treated by intra-peritoneal injection of goats' milk, they remain alive, while the others in which the milk is not used die.

Brieger and Wassermann, of Berlin,⁹²⁸ have published the result of new researches on choleraic vaccinations. They have already made known, in collaboration with Kitasato, a procedure which protected guinea-pigs against the comma bacillus, consisting in the culture of the bacillus in extract of thyme. They resumed their researches in the following manner: A culture of comma bacillus in extract of thyme, twenty-four hours old, was heated for fifteen minutes at 60° C. (140° F.), or for ten minutes at 80° C. (176° F.); it was then placed for twenty-four hours in a refrigerator. Of this culture, a cubic centimetre (16 minims) was injected into the peritoneum of guinea-pigs for four days. As in the former experiments, the first injection caused a fairly serious indisposition, with temperature raised to 40° C. (104° F.); this disappeared next day. If the symptoms became aggravated, the temperature descended

two or three degrees below normal. Subsequent injections provoked the same phenomena, but much less pronounced. After the fourth injection the animals were completely proof against the comma bacillus. It was possible to inject a dose of virulent culture, three times stronger than that sufficient to kill in twelve or fifteen hours the non-vaccinated guinea-pigs. The only symptom noticed was an elevation of one degree in the temperature, which afterward fell two or three degrees in a few hours. In the control animals the temperature fell to 30° C. (86° F.) in the same space of time, and death soon followed, with contractures, while the vaccinated guinea-pigs recovered by the next day. The minimum dose necessary to obtain absolute vaccination is 2 cubic centimetres (32 minims) in two days for a guinea-pig weighing from 300 to 400 grammes (9½ to 12¼ ounces). Two injections are usually sufficient.

The authors have tried to simplify their method by omitting the use of the extract of thyme and simply cultivating the comma bacillus in peptonized meat-broth, and heating these cultures at 60° C. (140° F.) for fifteen minutes. The guinea-pigs vaccinated with the culture thus prepared behaved in the same way as those which had received the injection of culture on thyme. The minimum dose, sufficient to produce complete immunity, is 2 cubic centimetres (32 minims). This cholera-proof state persisted nearly two months after vaccination. To demonstrate the comparative rôle of heat and of extract of thyme, the authors submitted the cultures of comma bacillus, added to extract of thyme, to the action of cold. The culture which had not been warmed, injected in the same doses, gave the guinea-pig the same immunity as was obtained in preceding experiments. It seems, then, that the extract of thyme has, in itself, the property of destroying the virulence of the comma bacillus, while conserving its vaccinating power.

Gamaleia, of Odessa, ⁹²⁷_{July 30} in the laboratory of Strauss, of Paris, has studied cholera in dogs. In these animals the disease presents much analogy to that in man. It is characterized by sanguineous or riziform diarrhœa, and especially by vomiting, which may last several hours. The animals die with cramp. At the autopsy, the digestive canal, from the stomach to the rectum, is found greatly altered. The mucus of the gastro-intestinal canal is sanguineous, as well as the contents, which, under microscopical examination, show the presence of small cells, originating

from the desquamated epithelium, all the epithelial layer having undergone modification. The protoplasm of the epithelial cells is granular and shriveled, as well as the nuclei. Dogs are remarkable, also, for the rapidity with which they acquire immunity from cholera. The day after the injection of virus, not sufficient to kill them, but productive of general indisposition with vomiting, the dogs became proof against large quantities, fatal for non-vaccinated animals. They can easily be vaccinated by chemical virus.

Galliard, of Paris,³ has studied the lesions of the biliary passages in cases of cholera. After observing a certain number of cases which recovered, in which icterus showed itself during the course and at the decline of the disease, and having established the fact that there is no *bilious cholera*, but many cases of *cholera complicated by icterus*, he reports a fatal case, with autopsy. The patient had been taken with icterus, in the course of cholera of slow evolution, during the stage of reaction, on the thirteenth day of the disease. Death ensued on the eighteenth day. At the autopsy, a suppurative angiocholitis of the large trunks and supuration of the biliary vesicle were found. According to the author, this suppuration must not be attributed to the comma bacillus, but to a secondary infection. Pettenkofer²⁴ has made experiments on himself with the vibrio of cholera. He swallowed a cubic centimetre (16 minims) of a fresh culture, made in broth, with bacilli sent from Hamburg by Gaffky. As the acids of the stomach kill bacilli, he took care to place his culture in 100 grammes (3½ ounces) of water containing 100 grammes (3½ ounces) of bicarbonate of soda. He lunched at 11, as usual, one hour after taking this choleraic drink before witnesses. At night he slept quietly. The next day nothing was observed. The day after there were four stools, more or less liquid, but the general state was good, appetite the same. The diarrhoea persisted for five days following. The swallowed bacilli found an excellent culture medium in the intestines, where they were abundantly reproduced, as shown by the bacteriological examinations of Pfeiffer and Eisenlohr. These micro-organisms disappeared little by little, as the stools recovered their consistency. Emmerich performed the same experiments with the same effects, having some riziform stools. The result of these experiments shows that ingestion of cholera germs is insufficient to cause the disease, but that to their

absorption must be added favorable climatic conditions and individual predispositions.

Heider, of Vienna, in examining the water of the Danube and of a canal entering that river, has found two vibrios, at present unknown. One of the two has the peculiarity of being scarcely distinguished from the cholera vibrio, and also of giving red reactions. These vibrios reduce methyl-violet bouillon, as does that of cholera. Cultures on potato give no distinctive signs, those on gelatin alone marking a difference; while with the choleraic vibrio the gelatin remains clear at the beginning of the liquefaction, the colonies of the kind discovered by Heider dissolve in gelatin, which liquefies. The bacilli have the common form, are pathogenic, but produce no cholera symptoms in animals.

Watkins, of New York,⁴¹⁰ who was vaccinated against cholera by Haffkine, sums up his observations as follows: "September 10th inoculation with the first vaccine at 11 A.M.; no effect until 5.45 P.M. At that time there was nausea, not followed by vomiting; went to bed and the nausea ceased. I felt a peculiar sensation in the head, which I did not think I could long endure. I was half-asleep. This lasted only ten minutes. My temperature before these accidents was 36.6° C. (97.8° F.). When the state which I have just described was ended, it was 36° C. (96.8° F.), and my friends told me that I was 'cold as ice.' Soon after my temperature ascended to 36.4° C. (97.5° F.) The next day I was well. I then made examination of my blood, with the following result: The red globules were nearly all indented, and seemed filled with granulations. The leucocytes appeared to be equally formed of granular matter. The globulins were more distinct than in normal blood. There were no filaments of fibrin. These alterations persisted three days. The fifth day after inoculation the blood had become perfectly normal. My temperature during these five days never exceeded 37.1° C. (98.8° F.) The same day, the fifth, about 11 o'clock in the morning, I was vaccinated with living germs (Haffkine's second vaccine). At 6 o'clock in the evening I began to feel cold, although I had fever, and I found myself as after the first inoculation. I thought I should not be able to finish dinner. But after this meal I felt very well, in spite of the fever, which lasted all night with a temperature of 38° C. (100.4° F.) On examining my blood at the time of indisposition, I found

it to be quite normal, except that it contained much fibrin and was thick. Thus, the second inoculation had in no way changed the blood. I noticed, in a subject convalescent from cholera, the same indented state of the globules observed in myself after inoculation with the same vaccine."

Max Gruber, ⁵⁷ of Vienna, has given the result of his new researches on cholera. He has made, with Wiener, intra-peritoneal injections of very small doses (3 milligrammes— $\frac{1}{2}$ grain) of a choleraic culture into guinea-pigs. After two hours the animals became ill, were extremely weak, with low temperature, and died in collapse. There was certainly a specific infection. Gruber and Wiener did not succeed in isolating cultures of the cholera poison, and are inclined to believe that this poison does not exist, and that the general symptoms of cholera are reflex phenomena, determined by mortification of the intestinal mucosa, and of its nerve terminations. According to the same authors, the majority of wines and beers rapidly kill the vibrios of cholera. They owe this property to their acidity, although this is very small. Vegetable acids possess the same properties, and 25 centigrammes ($3\frac{1}{4}$ grains) of citric acid, or 4 cubic centimetres (1 drachm) of fresh lemon-juice, diluted in a litre (quart) of water, suffice to kill all cholera bacilli in a quarter of an hour.

Girode, of Paris, ⁹²⁷ has communicated the result of his investigations on seventy-eight cholera patients at the Hôpital Beaujon. In sixty-seven cases he was able to isolate the comma bacillus. It appears that during the epidemic the virulence of the micro-organism had diminished, for, in order to kill a guinea-pig, a much larger dose of a culture isolated in September, 1892, was needed than of that isolated in April of the same year. In ten cases the author examined the vomit of the patients, and eight times was able to isolate the comma bacillus, perfectly vivacious, and, in one particular instance, existing almost as abundantly as in the rice-shaped stools examined at the same time. Girode ⁹²⁷ has also studied the action of the comma bacillus on the liver and the pancreas. Of twenty-eight autopsies, in which the liver was examined, in fourteen it was found to be invaded by the comma bacillus, although no clinical phenomena, pain, or icterus had drawn attention to it. In a prostrated anuric cholera patient, seized toward the end with epileptiform attacks and dead in thirteen

days, a granular cirrhosis, moderately atrophied with adenoma, was found. The weakened gall-bladder contained a small quantity of colorless bile. The comma bacillus was observed in the biliary ducts and in the hepatic parenchyma. The pancreas was especially changed,—large, hard, bosselated, with spots of congestion, having yellowish centres corresponding to pancreatic canals obstructed by a cloudy liquid containing many cellular elements and leucocytes, and also the comma bacillus.

Gamaleia, of Odessa,⁴⁵⁷ following the ideas and experiments of Cantani, has shown that there may be extracted from the cholera vibrio two specific poisons, different in their chemical properties and in their toxic effects. One of these poisons exists in a small quantity in filtered cultures, but is prepared in a much larger quantity by the sterilization of the cultures at a low temperature. The reactions correspond exactly to those of nucleo-albumen. By the action of higher temperatures another toxic substance may be extracted from the cadaver of the vibrio, which the author believes to be a product of the decomposition of the first. A temperature of 120° C. (248° F.) for one hour does not destroy it. This poison belongs to the class of nucleins.

Simmonds, of Hamburg,⁶⁹ has made some curious researches on the dissemination of cholera by flies. He removed nine flies from the opened intestine of a cholera patient and placed them in a large bottle, where they could fly, thus favoring the desiccation of the bacteria which they carried. At the end of a period varying from five to forty-five minutes, each one was placed in a tube containing liquefied gelatin. After shaking, the gelatin was poured out on plates, all of which, after forty-eight hours, were covered with innumerable colonies of comma bacilli.

Simmonds took six other flies, which he placed under a bell-glass, with a fragment of choleraic intestine. Then he put them in a large vase, where they remained an hour and a half, when he placed each in a tube of gelatin. The gelatin, transferred to plates, each time produced numerous colonies of comma bacilli. These experiments show that, at the end of an hour and a half, the flies which have been in contact with choleraic germs may prove a serious medium of infection, especially if they alight on such food as soup, sauces, and milk, which form excellent culture mediums for the bacillus in question. All choleraic dejections,

therefore, and the various foods on which flies may alight, should be placed carefully out of their reach.

Netter, of Paris, ¹²⁶_{p. 466} at the commencement of the Parisian outbreak, studied the cases in Paris and the immediately surrounding towns. He arrived at the following conclusions: Until July the cases of cholera in the suburbs contained the comma bacillus; those observed in Paris, on the contrary, did not contain it, although the symptoms were identical. The result was that, at this epoch, it was necessary to distinguish the cholera cases with comma bacilli from the cases of choleric diarrhoea without comma bacilli, the latter observed especially in Paris. The comma bacillus (first isolated by Netter) differed a little from that preserved since 1884 in the laboratories; but this must be attributed to the age of the cultures, living so long in broth in a saprophytic state. It is also well to recall that Cunningham, of Calcutta, has distinguished as many as ten varieties of the comma bacillus. The Parisian bacillus appeared to Netter identical to one coming from Cochin-China, whose Asiatic origin could not be doubted. Besides direct contagion, an ordinary vehicle of contagion is water.

CLINICAL PATHOLOGY.

Galliard, of Paris, ³_{sup.} describes a rare complication of cholera in a patient treated by repeated intra-venous injections by Hayem's method. Some hours before succumbing the cervical region was swollen, and, on applying the hand to this region, one could plainly feel the crepitation, characteristic of emphysema, on the anterolateral parts of the neck, extending the whole length, up to the maxillæ. Gaseous infiltration was observed on a level with the upper part of the sternum. There was no change in the color of the skin, which was moderately elevated by the emphysema.

At the autopsy an abundant gaseous infiltration was found in the cellular tissue of the neck, and of the anterior mediastinum as far as the hilum of the lungs. From this point the infiltration continued under the pulmonary pleura of both sides; there was none under the costal layer of the pleura. The emphysema was most developed at the level of the anterior edge of the left superior lobe, and it was probably at this point that rupture of air-vesicles took place. The cause of the rupture of the pulmonary lobules is unknown, and can only be conjectured.

Frey, of Vienna, ⁵⁹_{Sept. 28} relates an interesting post-mortem phenomenon of cholera. According to him, the so-called living interment of patients apparently dead from cholera can be explained by the fact that the bodies of those who die from this disease are subject, some time after death, to convulsive movements of muscles or groups of muscles. Eichhorst also reports a case in which he left the patient for dead, and in which, three hours later, he was told that the patient was resuscitated. He found the muscles of the forearm executing short, quick movements in rapid succession, interrupted by contractions of the entire group of muscles, while the arm was visibly contracted. The fingers moved as if playing the piano. It was not until three hours later that these muscular movements ceased.

Talamon, of Paris, ⁸¹_{Dec. 26} has advanced numerous arguments in favor of the unity of cholera; that is to say, the identity of Asiatic cholera with cholera nostras. He bases his theory on the fact that epidemics of choleric form diarrhœa rage from time to time, without its being possible to attribute them to importation, in places where true cholera had been previously observed. He speaks of the recent epidemic and of another in 1886, in the neighborhood of Paris, in which, clinically, the disease had been recognized as cholera nostras, in which, however, the bacteriological investigations had plainly shown the presence of the comma bacillus. He concludes that, at least during this past year, cholera nostras and Asiatic cholera were one and the same disease.

Delpuch, of Paris, ⁴²⁰_{Nov. 11} has treated, in the Hôpital Lariboisière, sixty-four cholera patients, twenty-six of whom died; a mortality of 40 per cent. As regards sex, the disease was more fatal in men than in women. This difference, which was also as clearly marked during the epidemic of 1884, must be attributed to alcoholism. A woman given to drink had delirium and succumbed; eight men, all drinkers, were delirious, and one out of the eight survived. This deadly action of alcoholism was the more remarkable since other diseases, present at the time of the choleraic attack, appeared to have no effect on the progress of the cholera. Patients suffering from cardiac affections, acute articular rheumatism, and pulmonary phthisis in the last stage have recovered from severe cholera.

Galliard, of Paris, ⁴²⁰_{Oct.} has made a very interesting study on the

clinical forms of pernicious cholera during the epidemic of 1892. He proposes the following classification of serious cases, based on the rapidity of evolution: 1. The sudden form, which kills in twenty hours at most, but which may be prolonged or even cured by intra-venous transfusion of Hayem's serum. 2. Galloping form, which kills in five days at the most, but may be prolonged and even cured by transfusion, and also cured without transfusion. According to Galliard, this galloping form should be considered as the common type in the epidemic of 1892. That which differentiates it from the preceding form is the fact that it is amenable to therapeutic influence in general, and to transfusion in particular. There is time for action. 3. Slow form, which includes three varieties,—(a) gastro-intestinal, the only one curable either with or without transfusion; (b) ataxo-adynamic, always fatal; and (c) marasmic, also always fatal.

The duration of this slow form may be three weeks. The end may take place either in a state of peripheral algidity (with or without central hypothermia), from congestion of the nervous centres, or from some complication, such as pneumonia.

The exanthem of cholera (papulous erythema) appears, on an average, on the tenth day, and has no prognostic signification. It sometimes coincides with the febrile state of the tenth day, which latter may exist without the exanthem in subjects who recover.

The three hundred and ninety-seven cases of cholera observed by Galliard offered the following clinical peculiarities: 1. There was no case of *dry* cholera. 2. The premonitory diarrhoea was often absent, especially in rapid cases. 3. On account of the greater number of patients being brought to hospital in a state of algidity, it was generally impossible to recognize the succession of classic stages. 4. At the period of algidity there was noted, beyond the classical signs, a painful compression of the scrotum,—a symptom which appears to have generally escaped the notice of authors. At this period, Galliard has also noted very low rectal temperatures (in one case, 32° C.—89.6° F.). 5. Final symptoms of asphyxia were actually observed in a large number of patients. 6. Cardiac adynamia constantly appeared. 7. Nervous phenomena were frequent. 8. Ultimate congestive symptoms occurred several times, the lungs being generally spared; the brain and the meninges always involved. 9. The reaction did not conform to the most

classical descriptions; that is to say, in being febrile, arising spontaneously and without interruption, after the algid stage. This reaction was only an artificial result of violent therapeutic disturbance from intra-venous transfusion; but all the symptoms appeared together: the awakening of the individual; restitution of cerebral function; return of speech, of urination, and especially of pulse and temperature to normal. 10. The typhoid reaction described by authors was never observed.

Netter ¹⁸⁴_{Aug. 16} calls attention to the signs of death in cholera patients. The cessations of respiratory and cardiac movements are not certain signs of death in this disease. The author proposes the following: 1. With an œsophageal sound, introduce by the mouth an abundant quantity of water into the digestive tube. The epithelial *débris* which covers the mucosa will become softened and the water be absorbed. 2. Place the body in a bath, at a surrounding temperature, the head naturally above water. 3. In a patient considered dead from cholera, make a small incision in the abdominal wall and inject an abundant quantity of warm water into the peritoneal cavity,—an operation which, in the event of revival, would be inoffensive.

Guttman, of Berlin, ⁶⁹_{p. 277} has furnished some information regarding the cholera in Berlin. He observed, at the Moabit Hospital, thirty cases of Asiatic cholera,—twenty-two men, six women, and two children. In those arriving by boat the river-water was necessarily admitted to have caused the infection, as well as possibly in some of the other patients; but in others no trace of contamination could be found. In grave cases the diagnosis is not difficult; in slight or suspected cases a diagnosis can only be made by means of bacteriological examination, which is so much the easier because the comma bacilli always show themselves in the first diarrhœal stools. The rice-water stools are only to be met with in a third of the cases, and are often of a bilious color, which are not against the diagnosis of cholera. The presence, in very liquid stools, of mucous flakes is almost a sure indication of Asiatic cholera. The urine is of great importance in diagnosis. In grave cases there is complete anuria, while in slight cases the secretion of the urine is always diminished.

In thirty cases Guttman had fifteen deaths. As regards treatment, he speaks of the inefficacy of intestinal antiseptics,

salol, creolin, etc., and of the injections of Cantani, which only reach the bacilli of the large intestine; while he affirms the good effects of subcutaneous injections of saline fluid.

Coste⁹² has studied the pupillary movements, in the algid stage of cholera, from a prognostic point of view, and draws the following conclusions:—

1. Whatever may be the gravity of the symptoms during the algid stage, even if there be intense cyanosis, if the normal or contracted pupils remain mobile,—that is to say, if they dilate when the eyelids are closed and return to their primitive diameter as soon as the lids are opened,—a favorable prognosis may be given; or, to be more precise, it may be said that the patient will pass happily through the algid period, without, however, being out of danger of a relapse or complications of the reaction period.

2. From the time that, during the algid stage, the pupils become contracted and immovable,—that is to say, do not dilate when the eyelids are closed,—it is certain, in spite of the paucity of grave symptoms, and even the return of certain functions which might cause a happy termination to be predicted, that the patient will succumb in the course of that period.

3. If, during the algid period, the dilated pupils remain immobile,—that is to say, no longer contract under the action of light,—the prognosis is fatal. The patient always succumbs in the course of this stage.

Tipiakoff, of Saratow,³¹⁷ reports that, from June 27th to September 9th, 243 women were admitted to the infirmary of Saratow. There were 121 deaths. Seven of them were pregnant at the time of their admission; 4 were in their third month, 2 in their seventh, and 1—a primipara—had gone her full time. The latter alone survived, and all the children died. In each case abortion took place. The uterine contractions commenced with cramps, when abortion followed. With the exception of one case, the placenta was expelled immediately after the fœtus. The contrary was the case in Paris, where the woman died before delivery. Besides pregnancy, uterine, tubal, and peritoneal hæmorrhages were observed. The contractions prevented gaseous exchange between the mother and the fœtus, and led to separation of the placenta from the uterus; and this again led to the death of the fœtus, which Tipiakoff does not think should be attributed to cholera poison.

Prophylaxis and Treatment.—Heyse, of Hamburg, ⁶⁹_{p.1074} has brought forward the researches made by him at Hamburg during the cholera epidemic. The only remedy which appeared to have a happy effect on the disease was intra-venous injections. The sterilized liquid was brought to the barracks in large balloons, from which the irrigator was filled. To avoid infection, the tubes of the apparatus were filled with gauze filters. This method was very successful. The solution used contained 6 grammes (90 grains) of sea-salt per thousand, and sometimes Heyse added 6 or 7 cubic centimetres ($1\frac{1}{2}$ or $1\frac{1}{8}$ drachms) of alcohol per litre (quart). The choice of the vein is unimportant. Nevertheless, when the injection is repeated (which has been done as many as eight times), it must, as far as possible, be made in another member. The sole medicament of which systematic use was made at Hamburg was calomel, administered in varying doses up to 0.50 gramme ($7\frac{1}{2}$ grains). Heyse prescribed it in doses of from 0.10 to 0.20 gramme ($1\frac{1}{2}$ to 3 grains), until the stools had taken a greenish hue, and good effects were obtained. The greater number of other drugs failed, or gave but very imperfect results.

Volovski ⁵⁸⁶_{No.51} communicates the treatment used successfully by him during the cholera epidemic of 1872, which was especially directed against the emesis. The patients were given a warm bath, at a temperature as high as could be borne (never under 30° R.— 99.5° F.). A bag full of ice was simultaneously placed on the head. The vomiting ceased while the patients were in the bath, the minimum duration of which was half an hour; the patients willingly remained longer, if cracked ice were given them to swallow. A few minutes after the bath, $1\frac{1}{2}$ grains (0.08 gramme) of calomel and 30 grains (2 grammes) of castor-oil, with wine and brandy, were administered, being then tolerated. On coming out of the bath the patients were rubbed, dried, and a large sinapism, prepared in advance, was placed on the abdomen, the sides, and on the epigastrium, up to the middle of the sternum, being kept in place by a bandage. During the whole time of its action the vomiting was found to cease. Volovski declares that if the patient support the sinapism, without complaining, during half an hour, the prognosis is unfavorable; if he endure it an hour or more, a fatal issue is inevitable. On the contrary, if the patient quickly begin to complain of pain in the abdomen, and if it be necessary

to reason with him in order to induce him to keep it on for fifteen or twenty minutes, one may hope for a cure. If yellow stools occur afterward, recovery is certain.

Lesage, of Paris, ¹⁰_{Nov. 2} has instituted, at the Hôpital St. Antoine, the following treatment against cholera: Every cholera patient is plunged into a warm bath (40° C.—104° F.) for twenty minutes or half an hour, and the bath is sprinkled with mustard during the last few minutes. If there be no reaction a transfusion is made, at 38° C. (100.4° F.), with 1000 grammes (1 quart) of artificial serum. If the cholera is very rapid and severe, the treatment fails. In cases in which the disease is not so rapid in progress, the patient is systematically submitted to an absolute diet and to the following prescriptions: (a) Solution of lactic acid, 15 grammes ($\frac{1}{2}$ ounce) per litre (quart); 2 litres (quarts) per diem. (b) Tea with rum, ice, and Seltzer water. (c) In cases of intense and repeated vomiting, the stomach is irrigated with boiled water and filled with 500 grammes (1 pint) or a litre (1 quart) of lactic-acid solution. (d) The warm bath at 40° C. (104° F.) is repeated every two or three hours. The principal results of this practice are: (1) elevation of the rectal temperature from 0.5° to 2° C. (0.9° to 3.6° F.), according to the case; (2) increase of the activity of the circulation; (3) the appearance of diaphoresis; (4) the diminution of cramps. (e) If the patient again become algid, in spite of the baths, he must submit to another transfusion, several times repeated. (f) The emission of urine is provoked by filling the bladder with warm boric acid; this often gives good results. (g) As adjuncts to this treatment, caffeine, ether by subcutaneous injection, oxygen inhalations, cupping, and wrapping in wadding may be employed, according to indications. (h) The appetite quickly returns by the use of lactic acid. Lesage advises, for the first diet, coffee, broth, and bread. With many patients, milk causes a return of digestive troubles. With this treatment, a cholera reaction has seldom been observed.

Winternitz, of Vienna, ¹⁰⁰¹_{Oct. 10} is a partisan to hydrotherapy as a prophylactic, neurasthenic, and preservative means against chills, as well as a remedy for the so-called premonitory diarrhoea. By this method he has succeeded in curing a large number of patients already suffering from cramp in the calves, vomiting, cold extremities, and discolored stools. He practices friction of the

skin with a piece of linen soaked in the coldest water; then a sitz-bath, at a temperature of 8° to 15° C. (44.4° to 59° F.), during fifteen or thirty minutes. The parts of the body not in contact with the cold water are enveloped in woolen coverings, and the abdomen is energetically rubbed.

Galliard, of Paris, ¹⁰_{Sept. 27} has given the results of the treatment of cholera patients by the intra-venous transfusion of artificial serum. The liquid injected was as follows:—

R Distilled water, sterilized,	. . .	1000 grammes (1 quart).
Sodium chloride,	. . .	5 grammes (1¼ drachms).
Sodium sulphate,	. . .	10 grammes (2½ drachms).—M.

The dose injected was 2 litres (quarts) for adults, and less in proportion for adolescents and children. The temperature of the liquid should be 58° C. (136.4° F.), and each transfusion should last at least a quarter of an hour. The transfusion does not destroy the cholera poison, does not kill the microbes, but time is gained; the action of remedies is thus enhanced. The necessary indications for intra-venous transfusion are that the patient must be in a state of algid collapse, with suspension of radial pulse. The emission of urine, after transfusion, is a happy augury. If, on the contrary, there be an exacerbation of the diarrhoea and vomiting, if there be a rejection by the stomach and intestines of the serum introduced in the veins, the operation has failed, and must be speedily repeated. The transfusion has often failed, but has never appeared to aggravate the condition of the patients.

Siredey, of Paris, ⁴²⁰_{Nov.} gave his patients lactic acid, elixir of paregoric, champagne, injections of ether and caffeine, and oxygen inhalations. He considers transfusion the best means of fighting a case of grave cholera, but also advises repeated hypodermatic injections of artificial serum. These injections are made deeply into the thighs or into the buttocks, 150 to 300 cubic centimetres (5 to 10 ounces) of liquid being injected at a time, and this repeated four or five times in twenty-four hours. The method was employed with fifty-four patients, all in a grave state. There were sixteen recoveries without transfusion. This treatment has the advantage that it can be tried from the beginning, transfusion being reserved for the end.

Cantani, of Naples, ⁴_{Nov.} distinguishes three stages in the course of cholera:—

1. Premonitory diarrhoea. A double indication presents itself in the first stage,—to restrain the development of the bacilli in the intestine, and to neutralize the cholera poison. For this purpose, Cantani proposes tannic acid, by irrigation or enteroclysis. By means of a special irrigator, he injects into the intestine $1\frac{1}{2}$ to 2 litres (quarts) of water or infusion of chamomile, containing 5 to 20 grammes ($1\frac{1}{2}$ to 5 drachms) of tannic acid, 20 to 30 drops of laudanum, and 20 to 50 grammes (5 to $12\frac{1}{2}$ drachms) of gum arabic. The temperature of the liquid should be 38° to 40° C. (100.4° to 104° F.), in order not to chill the patient. The injection should be repeated four times a day, and, in grave cases, after each alvine evacuation. Cantani and Bela Augian claim to have obtained 100 per cent. of recoveries by this method.

2. The algid stage. Besides the two indications of the first stage, it is necessary to eliminate the toxins in the blood and to restore to it the quantity of water subtracted by the diarrhoea. If this result be not obtained by enteroclysis, one may have recourse either to transfusion of blood or to an intra-venous injection of saline solution. But, seeing the danger that these operations present, Cantani proposes to inject artificial serum containing 4 grammes (1 drachm) of chloride of sodium and 3 grammes (45 grains) of carbonate of sodium per litre (quart) of sterilized water, warmed up to 40° C. (104° F.), into the subcutaneous conjunctive tissue. This procedure gave Cantani 60 per cent. of cures. He prefers it to intra-venous injection, in which the liquid is diffused slowly.

3. The stage of typhoid reaction. While seeking, by the preceding means, to rid the circulatory stream of the toxins, acidity of the blood must be guarded against. To this end, Cantani proposes to replace the tannic acid by a solution of salt water, of 10 or 15 per cent., for enteroclysis, and, if need be, to continue hypodermoclysis.

Kohos, of Manchester, found cocaine to be beneficial, hypodermatic injections of 0.05 to 0.10 gramme ($\frac{1}{4}$ to $1\frac{1}{2}$ grains) being employed. Immediately after the injections vomiting and cramp of the calves ceased, the thirst diminished, the circulation improved, collapse disappeared, and the patient was relieved; at the same time the functions were stimulated with cognac and champagne. Cholera patients tolerate cocaine, even in large doses; in two cases

0.15 to 0.25 gramme (3 to 4 grains) were injected without the least toxic symptom.

Neumann⁶⁹ argues in favor of subcutaneous injections of salt water in cholera. The quantity of liquid injected is from 100 to 300 cubic centimetres (3½ to 10 ounces) for children, and 1000 to 1500 cubic centimetres (1 to 1½ quarts) for adults. The liquid contains, per litre of water, 0.7 gramme (11 grains) of chloride of sodium, with or without the addition of carbonate of sodium, in the proportion of 0.1 per cent.; 1 per cent. of absolute alcohol may be added. The temperature of the solution should be from 38° to 42° C. (100.4° to 107.6° F.). According to Neumann's method the caoutchouc tubes and liquid are sterilized by boiling. The cannula, armed with a fairly-large trocar, is plunged, parallel with the surface of the integuments, into the subcutaneous cellular tissue, by preference in the region of the flanks. It is pushed slowly in as the liquid flows out. The swelling caused by the penetration of the liquid under the skin is energetically rubbed away with the fingers. When the cannula is taken away the puncture-wound is covered with a small piece of diachylon plaster.

Desprez, of St. Quentin,¹⁰ proposes a treatment by chloroform. 1. To destroy the comma bacilli in the digestive canal, and to neutralize their secretions. 2. To calm the painful cramps of the stomach, which render that organ incapable of supporting either medicines or drink. 3. To actively stimulate the functions of the skin, so closely connected with those of the digestive canal, and of the kidneys. 4. When absorption is possible, to introduce into the economy the principles capable of re-establishing, as far as may be, the normal composition of the blood; medicaments that will render it fluid, and available for capillary circulation. With this end in view, he employs the following medicaments, in the form of a potion:—

R Chloroform,	1 gramme (15 grains).
Alcohol,	8 grammes (2 drachms).
Ammonia acetate,	10 grammes (2½ drachms).
Water,	110 grammes (3¾ ounces).
Syrup of hydrochlorate of morphine,	40 grammes (1½ ounces).

Mix. Dose: Tablespoonful every half-hour until the symptoms subside.

As a preventive, the author employs chloroform-water, sweetened to taste. Delpeuch, of Paris,⁴²⁰ made no intra-venous injections in his cases, and in the actual epidemic the statistics

of the services where no injections were made were better than the others. In the absence of specific treatment, he treated the symptoms. Irrigation of the stomach alone succeeded in stopping vomiting. Against diarrhœa, opium and lactic acid were either useless or insufficient. Irrigations with 2 or 3 grammes ($\frac{1}{2}$ or $\frac{1}{4}$ drachm) of creasote appeared to be more efficacious. Against algidity and cyanosis, hot baths, injections of caffeine and ether had no effect. Injections of sulphate of strychnine, up to 0.004 gramme ($\frac{1}{16}$ grain) in twenty-four hours, alone raised the pulse, or caused it to re-appear after suppression.

Dujardin-Beaumetz, of Paris,²¹⁴⁸ gives the following *résumé* of the first aid to be given to cholera patients: 1. To combat the diarrhœa, by administering three tablespoonfuls of the following lemonade, every half-hour:—

R Lactic acid, 10 grammes (2½ drachms).
 Syrup of sugar, 90 grammes (3 ounces).
 Tincture of orange, 2 grammes (80 minims).
 Poured into 1 litre (1 quart) of water.—M.

2. To arrest the vomiting: cracked ice or drinks containing carbonic acid, and, every hour, 20 drops of paregoric.

3. To warm the patient: warm alcoholic drinks, strong coffee with brandy, tea with rum, grog; dry, energetic friction, warm coverings, hot-water bottles or hot bricks around the patient.

T. Ffrench-Mullen,³⁰⁶ ^{July, Sept. 17} states that he has given hypodermatic injections of strychnine in some hundreds of cases of cholera, with very satisfactory results. He uses the method in every case in which collapse has set in or seems to be coming on. He gives 5 minims (0.32 gramme) of liquor strychninæ in an equal quantity of water. As his patients were almost all seen in their own homes, and there were so many to be visited, it was, as a rule, only possible to give two injections in the day, morning and evening, to any one case. He has, however, given five injections in twenty-four hours and two more during the following twelve hours in the case of a prisoner, where the effects could be watched, and has no doubt that the man owed his recovery to the remedy. When the urinary secretion has not been re-established within twelve hours or so of the cessation of the other symptoms, Ffrench-Mullen has given hypodermatic injections of pilocarpine with

marked success in many cases, urine being passed within less than five minutes after the use of the syringe.

Eisenlohr, of Hamburg,⁶⁹ has been able to experiment, on a fairly large scale, with treatment by subcutaneous and intra-venous injections of salt water. In cases already in the stage of asphyxia a proportion of recoveries of 34 per cent. by subcutaneous injection, and of 21 per cent. by intra-venous injection, was observed. One may ask if the diminution of mortality at Hamburg was really due to the use of subcutaneous and intra-venous injections of salt water. Eisenlohr asks the question, but does not answer it. He considers Cantani's method (enteroclysis, with a 2-per-cent. solution of tannin, in the algid stage) of little value. The internal administration of opium generally yielded bad results. Eisenlohr believes that the present resources of therapeutics in cholera leave much to be desired.

Gibert, of Havre,¹⁰ describes the measures of disinfection taken at Havre during the last epidemic. The inhabitants, without exception, were made to leave the contaminated houses, and sent to camp out under a tent. Then followed: 1. Disinfection of linen in drying-room. 2. Disinfection of the premises by means of pulverization by water, 12 litres (12 quarts); sublimate, 15 grammes ($\frac{1}{2}$ ounce); tartaric acid, 30 grammes (1 ounce). 3. Disinfection of drains with water, 1 litre (1 quart); sulphate of copper, 50 grammes ($1\frac{3}{4}$ ounces). 4. Washing of the walls, staircases, vestibules, and passages with a 5-per-cent. solution of cresyl, afterward whitewashing with lime. 5. Scraping or removal of paper from the walls and cupboards; then whitewashing with lime. Washing of floors, stairs, ground of courts, and water-closets with a 2-per-cent. solution of sulphate of copper. 6. Washing, by water and fire-hose, of the leaders, roofs, gutters, courts, and ground. 7. Disinfection of the drains, generally found in each story. 8. Cleansing of the gutters in front of each building. After such measures, there was no return of cholera in the houses thus treated at Havre.

Pfuhl, of Berlin,⁶⁹ has made experiments to determine the efficiency of milk of lime, recommended by the Prussian government, for the disinfection of choleraic faecal matter. A choleraic stool was mixed with an equal quantity of milk of lime and shaken for a minute and a half. In an hour all the bacilli were killed. The

same experiment was repeated, but the mixture was shaken but a few instants; the result was the same. Finally, Pfuhl simply poured the milk of lime into the stool, without shaking. The milk of lime fell immediately to the bottom of the vessel and no mixture took place. In an hour's time few bacilli were killed. These experiments show milk of lime to be a good disinfectant, but must be well mixed with the matters to be sterilized.

Daremberg, of Paris,²¹⁴⁸ in a work of practical hygienic value, traces the history of the different cholera epidemics which have appeared up to the present year. After having studied the habits of the cholera microbe, the author makes use of the most authoritative scientific researches to demonstrate how cholera is propagated; how its germs are found preserved in the soil, in the water, and in the dust of the air. Daremberg thinks that irrigation with sewage water containing cess-pool matter preserves the cholera microbe in the soil. In his opinion, quarantines are delusive and should be replaced by efficacious and very simple disinfection. He gives the individual precautions to be taken during epidemics, which should be an almost infallible prophylactic against cholera.

DIARRHŒA.

Etiology.—The causes of diarrhœa are to-day fairly well known, and, with the exception of some rare etiological factors, investigations have borne especially upon infectious diseases. Gaffky, of Giessen,⁶⁹ reports three very interesting cases of an acute intestinal infection, in two assistants and a workman in the laboratory, after drinking the milk of a cow suffering from hæmorrhagic enteritis. Bacteriological researches showed, in the stools of the patients, the existence of a small bacillus, very mobile and very virulent for mice and guinea-pigs; the same bacillus was found in the intestines of the cow from which the milk was obtained. Gaffky considers this as a strong argument in favor of boiling milk before its use.

Gregorieff⁵⁸⁶ has studied the fœces of patients suffering from hæmorrhagic diarrhœa, finding a special bacillus, which stains with difficulty, does not liquefy gelatin, and gives out, in culture, an odor of decayed eggs; it is like the bacillus of glanders, but much longer and less mobile. It exists only in the intestines. Injected into animals, it is powerless if intestine has previously been irri-

tated by a caustic ; and, even in the latter case, ulcerations do not form, and the animals recover.

Roudneff,⁵⁸⁶ starting with the idea that hæmorrhagic diarrhœa is of microbial origin, has submitted 45 patients to injections of sublimate. Veltchine and Lemoine had already successfully tried this treatment. The author observed no mercurial intoxication. Each day the dose was 188 cubic centimetres (6 ounces) of a 1-6000 solution. In 30 cases the sanguineous dejections disappeared on the second day ; in 10 cases, on the third day. In 2 cases the injections failed, and the patients died. Lion and Marfan⁷⁵¹ describe two fatal cases of dysenteric enteritis, caused by the bacterium coli communis, the peculiar feature of the cases being that there was no fever or typhoid symptoms. P. de Mialhe⁵⁸⁶ has made a series of experiments on rabbits, to determine the nature of lesions produced in the digestive organs by the administration of mercurial preparations. The greater number were harmless, while sublimate in solution rapidly produced a fatty degeneration of the mucous glands.

Crombie²⁰⁶ gives the history of a curious disease, "hill diarrhœa," which shows itself in India in the mountainous districts, at and over six thousand feet above sea-level. One characteristic is, that the attacks come on from 3 to 5 o'clock in the morning and last until 11 o'clock. The rest of the day the patients are in perfect health, but the attack returns the next morning. It is accompanied by gastro-intestinal flatulence, but is not painful. It only affects adults, very rarely children below 12 years of age. It appears to be connected with the *monsoons*, beginning and ending with the rainy season. The diarrhœa is liquid, foamy, slightly colored, and resembles milk of lime. As regards treatment, the patient must remove from the mountains ; generally speaking, this is sufficient, but sometimes medical aid must be resorted to. This consists of intestinal antiseptics, pepsin, and cholagogues.

Eybert²¹⁰⁰ has studied the diarrhœa of reflex origin in diseases of the nervous system, comparing the forms of nervous diarrhœa observed in certain well-marked diseases, such as tabes, hysteria, neurasthenia, and exophthalmic goitre. This phenomenon is so much the more interesting from the fact that at the beginning of the diseases, or in their abortive forms, the diarrhœa may, in consequence of its tenacity and continuation, constitute the only marked

symptoms of a diseased condition, of which the patient may complain.

Pathology.—Dyson, ²_{v.1, p.22} communicates a case of ulcerative colitis. The patient had suffered for several months from incoercible diarrhœa; the stools were liquid, ochre-colored, and latterly tinged with blood, containing neither pus nor mucus. The patient died from asthenia. The autopsy showed grave colitis with numerous ulcerations from the middle of the transverse colon to within two inches of the rectum.

Vergely, of Bordeaux, ⁷⁰_{v.1, p.10}, reports a case of subacute catarrhal enteritis, in a child of 6, which is worthy of notice, because the disease was accompanied by abundant and repeated intestinal hæmorrhages, beginning, probably, at the end of the small intestine. The author ascribed the condition to a simple inflammatory congestion of the intestine. Ice-bags were placed about the abdomen and the child recovered.

Bottentuit, of Plombières, ²_{v.1, p.10} gives the general history of catarrhal enteritis. After carefully describing the symptoms, and insisting on the part which the cerebro-spinal nervous system takes in the production of the affection, he demonstrates the advantages arising from the cure at Plombières, which always ameliorates the condition of the patients. Apropos of Bottentuit's note, C. Percival Crough ²_{v.1, p.10}, reports two cases of catarrhal membranous enteritis.

Treatment.—Fussell, of Philadelphia, ⁸⁰_{v.1, p.10} reports several cases of infectious and other diarrhœas treated by salol. He thinks that this drug, combined with bismuth and chalk, is the most satisfactory remedy for the disease, more especially in children. Hayem, of Paris, ⁸⁵_{v.1, p.10} recommends calomel as a purgative in infectious diarrhœa, but in combination with opium, as its effect alone is somewhat painful. This treatment should be supplemented by intestinal antiseptics,—salol, or salicylate of bismuth, with powdered charcoal. Hayem's method, by lactic acid, has been successfully employed by Schtschegolew and Tschernyschew, ⁴¹_{v.1, p.10} who report sixty cases of various forms of diarrhœa treated by this method, which has a specially good effect in intestinal catarrh and intestinal tuberculosis.

Dujardin-Beaumetz, of Paris, recommends, in cases of putrid diarrhœa, lavage of the intestine with antiseptic solutions (boric acid or naphthol), taking care to make the lavage as complete as possible. He uses the Debove tube for washing out the stomach.

This treatment should be combined with purgatives and a vegetable diet. Pollatschek⁴ recommends the use of warm mineral waters in the same manner. Besides these treatments, founded on the etiology of the disease, certain medicaments are especially recommended by various authors.

Hugo Schulz¹¹⁶_{No.3} recommends tincture of columbo. Weber⁵⁹⁹_{No.17} combines the extract of monesia, a Brazilian plant, with columbo. Hendley, of Peshawar,¹⁵_{Am.} extols the use of strychnine, combined with digitalis, in diarrhœa accompanied by remittent fever. He thinks that these two medicaments tend to strengthen the weakened heart, and to stimulate the muscular tonicity of the intestine; and believes that the method might also be applied to other forms of diarrhœa.

Demiéville¹⁹⁷_{No.1} recommends subcutaneous injections of sterilized salt water in the collapse resulting from infantile gastro-enteritis, and quotes a case where a patient, *in extremis*, was cured in a few hours by this method.

DYSENTERY.

Bacteriology and Pathological Anatomy.—The exact micro-organism of this disease not having yet been determined, the study of the subject is most interesting. Ogato, of Tokio,²⁰⁰_{Am.} gives the history of an epidemic of dysentery in the prefecture of Oita, Japan. Bacteriological examinations gave the following results: The stools, the mucous surfaces of the large intestine, and the edges of the ulcers contained a large number of small, fine bacilli, staining by Gram's method. Histological section showed them to be of the same thickness as the bacillus tuberculosis, and about a quarter of its length. In suspended drops they appeared united in twos like diplococci, and very mobile. They develop on plates in twenty-four hours at the temperature of the room. These bacilli were pathogenic for mice, cats, and guinea-pigs. In the two latter, by ingestion, by subcutaneous injections, or by enema, they provoked a sanguinolent diarrhœa, with ulceration of the large intestine. It is probable that this is the specific micro-organism of dysentery in Japan.

Councilman, of Baltimore,²⁰¹⁸_{May 28} made a very interesting study of dysentery, dividing it into three forms: (1) diphtheritic form; (2) catarrhal form; (3) amœbic form. In the diphtheritic form, the commonest in epidemics of acute dysentery, there is necrosis

of the epithelium and pseudomembranous exudation. There is so great a tendency to spread that at times only a few patches of healthy mucosa remain. The catarrhal form—evidently badly named—comprises the cases which cannot be classed with the other two; it is characterized by an inflammation of the mucosa, ending in ulceration. Its etiology is still obscure. Amœbic dysentery is characterized by well-defined anatomical lesions and a well-known etiological factor. The lesions consist of nodules containing cavities filled with pus; around these nodules is an œdematous zone. The nodules, variable as to location, are situated in the submucosa. In these nodules and in the stools are found the amœbæ, the cause of the disease. Amœbic dysentery is wide-spread, but is observed principally in intertropical regions, and among the Europeans inhabiting them.

Gerry, of Jamaica Plains, Mass., ⁶¹_{July 28} reports a carefully-observed case of amœbic dysentery. Maggiore ⁵⁰_{ii. 11, Nov. 4, 7} believes that epidemic dysentery arises from various causes, and gives the list of micro-organisms which he has met with in the twenty cases that he has examined.

Epidemiology.—Lardier and Peruet ³³_{Jan.} report an epidemic of dysentery at Rambervilliers, affecting two hundred and fifty persons and arising from the contamination of the springs which supply the town with drinking-water.

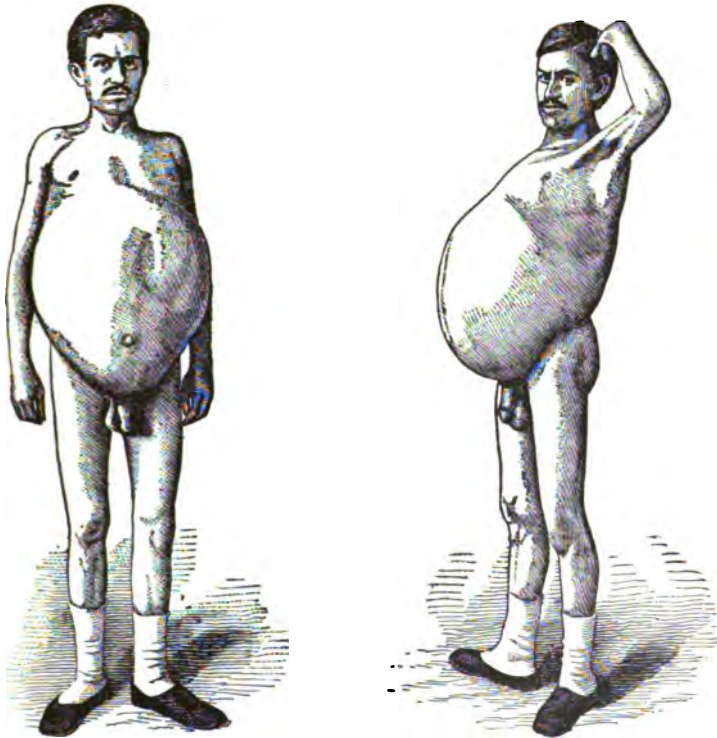
CONSTIPATION.

Formad, of Philadelphia, ¹¹²_{Jan.} reports a case of enormous congenital development of the colon, causing habitual constipation. This very interesting case, in which the constipation was the result and not the cause of the dilatation, is extraordinary, and no similar one has been recorded. The patient, 29 years of age, had so large an abdomen that he was exhibited under the name of the "balloon man." On striking the abdomen with the fist, a sound was produced like that of a drum. He died suddenly, and the autopsy showed an enormous dilatation of the colon, which was as large as that of an ox. There was no other lesion of the organs, and it is to be supposed, from reading Formad's report, that he succumbed to syncope, due to pressure of blood on the heart, or to a displacement of the heart. The illustrations represent the patient during life, and also show the colon removed from the

abdomen. In the last illustration (page 30) the normal human colon is also given, in order to establish the comparison.

ASCITES.

Johnson-Alloway, of Montreal,²⁶² reports a case of collapse after evacuation of ascites, cured by intra-peritoneal injection of salt water. Laparotomy, on a woman suffering from considerable



Front view, showing distension of abdomen.

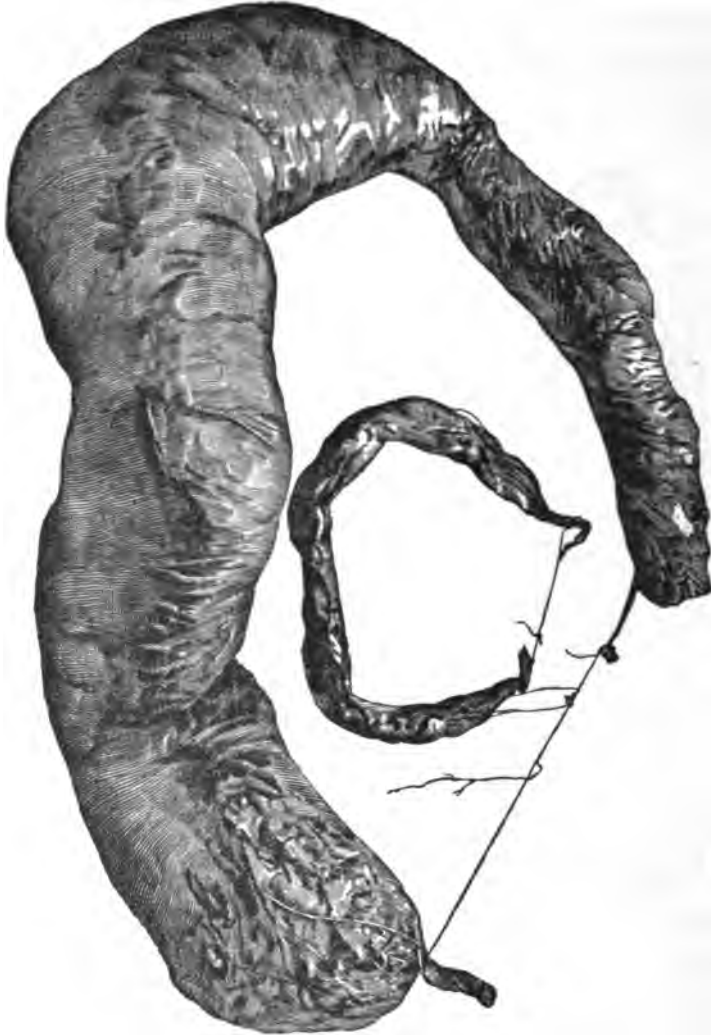
Side view, showing distension and shape of trunk.

CASE OF COPROSTASIS.
(*University Medical Magazine.*)

ascites, showed a tumor of the ovary. Three gallons (12 litres) of liquid were drawn off. Some hours after the abdomen had been closed the patient fell into collapse, no doubt caused by the sudden withdrawal of so large a quantity of water. Three quarts (3 litres) of a sterilized salt solution were injected into the peritoneum through the wound. The pulse rapidly became higher and the patient recovered.

Chylous Ascites.—Mienwondt and Rozenzweig² read, before

the British Medical Association of the Cape of Good Hope, the history of a case of a child of 15 months, that was taken with



HUMAN COLON; CONGENITAL GIANT GROWTH AND COPROSTASIS.

The more distended end is the sigmoid flexure. The narrow part taking exit from it represents the greater part of the rectum, which was normal. The narrow distal end of the preparation represents the head of the colon with the string attached to a fragment of the small intestine. The arched part of the specimen represents the transverse portion of the colon. The figure within represents a normal human colon photographed simultaneously for comparison of dimensions. Dried preparations.

(*University Medical Magazine.*)

intermittent abdominal pains, accompanied by fever, moderate ascites, and tympanites. In two months eleven punctures were made, which yielded 680 ounces (20,400 grammes) of liquid;

when, after several attacks of diarrhoea, the liquid decreased and the child recovered. The liquid drawn off by the punctures resembled milk rich in cream, of a density of 1022. It did not coagulate spontaneously, and contained much albumen and fat. Under the microscope a granular base was seen, with large, kernel-like cells floating here and there. The authors ascribe the origin of this ascites chylosus to repeated attacks of peritonitis, the filaria being unknown in Cape Colony.

Henderson reports a similar case. A little girl of 10 was attacked by grave ascites, with rapid cachexia. Thinking it to be tuberculous peritonitis, they decided to open the abdomen, when a full gallon (4 litres) of liquid escaped, having the appearance of milk rich in cream, resembling chyle and becoming transparent when treated with ether. The mesenteric ganglia were very large. After appropriate general treatment the patient recovered. The origin of the chylous liquid, in this case, appears to have been a simple obstruction to the spontaneous flow of chyle through the mesenteric ganglia, or the compression of the receptaculum chyli by these ganglia.

INTESTINAL OCCLUSION.

J. Touchard, of Paris, ⁷⁸_{Jan. 30} reports a very curious case, with rare and abnormal symptoms, in a patient who succumbed to an intestinal obstruction caused by volvulus in the lower intestine, and which, during life, presented symptoms resembling far more those of cholera than of intestinal obstruction. At no time during the disease did the abdomen show tympanism, either in a general or partial development,—a phenomenon which appears absolutely irreconcilable with the presence of an obstruction situated so low. During the whole illness the vomiting was either bilious or alimentary, at no period having a faecal character; it was without effort, oftenest after ingestion of food. Instead of constipation, there was much diarrhoea and a veritable intestinal flux. The autopsy showed, however, that there was a true obstruction, with a gangrene of the intestine extending fifteen centimetres in length. F. König ⁸⁰¹_{S.M.B.S.; Aug} ¹¹² reports five cases of stricture of the intestine due to cicatricial contraction of tuberculous ulceration, all treated by laparotomy and resection of the gut with circular suture. Two died,—one from exhaustion, the other from the giving way of a suture and

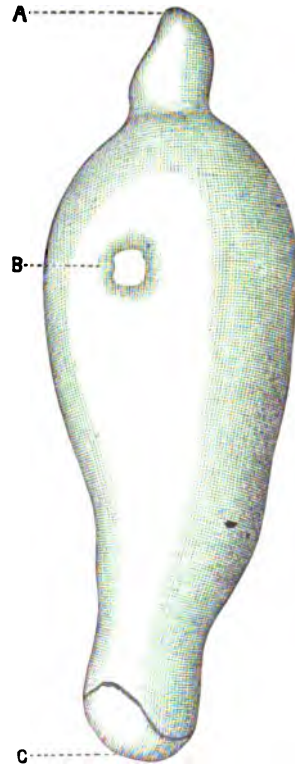
peritonitis. He considers this condition more frequent and more easily recognized than has hitherto been thought. The diagnosis is to be made by the peculiar chronic history of frequent attacks of severe colic, with constipation, distension of the abdomen, visible peristalsis, and peculiar splashing and musical sounds, ending with a sound which resembles that of fluid driven forcibly from a syringe. There are usually no symptoms before those of stenosis. The disease is more frequently found in persons between 20 and 30 years of age, and especially in those suffering from other tuberculous lesions. It causes great emaciation and anæmia. In spite of the feebleness of the patients, König thinks surgical interference advisable, especially as the ulceration is probably still progressing in front of the cicatricial contraction, and often the tuberculous disease elsewhere is not yet far advanced.

Bonuzzi⁵⁹⁴ gives a report of two very interesting cases of this complication. The first was that of a woman, 59 years old, in whom the use of the corset had brought about complete division of the right lobe of the liver, the inferior portion, nearly six centimetres in length, being united to that organ merely by a band of fibrous tissue, and pushed upward. The gall-bladder was united to the moving fragment, and fixed to the colon by adhesions of peritoneum. In consequence of these lesions, the transverse colon was drawn up, and the traction thus exerted had induced a twisting of the intestines and an obstruction of the intra-intestinal circulation; the accumulation of fæces and gas beyond that fold had completed the occlusion. This is a unique case, and undoubtedly the first observation of the kind reported. The second case was that of a man, 59 years old also, suffering from a volvulus of the sigmoid flexure of the colon, caused by the twisting of its own mesentery (sigmoid mesocolon). This volvulus was due to the extraordinary length of the sigmoid flexure, which was four times the usual size, the large intestine, in its entirety, measuring 2.83 metres,—that is, 1.18 metres longer than normal. It was a case of congenital, abnormal development of the large intestine, or perhaps of a mesenteric peritonitis during foetal life. The intestinal circulation in such cases is carried on without difficulty during infancy and childhood, but in old age the diminution in the energy of the peristaltic movements of the intestines causes a stagnation of the fæcal matter in the

vicinity of the sigmoid flexure, and the twisting of this part of the intestinal canal takes place with great facility.

VERMIFORM APPENDIX.

Clado, of Paris, ⁷⁵¹ in a very interesting anatomical study, states that the vermiform appendix is kept in place by two folds of the peritoneum, a *meso-appendix* which is attached to the iliac fossa, and a second fold, perpendicular to the first, which is attached to the posterior portion of the small intestine. He notes, in the angle formed by the appendix, the cæcum, and the small intestine, a lymphatic ganglion which has not before been described. This ganglion receives all the lymphatic vessels of the appendix. In woman, a peritoneal fold unites the appendix to the ligament of the ovary, which explains the easy transmission of inflammations from one organ to the other. The structure of the appendix is similar to that of the large intestine, but, according to Clado, this must be rather a glandular organ than an organ of absorption; in fact, its mucous glands and lymphoid tissue are much developed, and, in a normal state, the appendix never contains faecal matter. In a healthy state, and *immediately after death*, the only micro-organism found there is the bacterium coli commune,—a microbe most often met with in appendicitis. Adenot, ⁷⁵¹ _{Nov. 7, '91} of Lyons, reaches the same conclusions, having studied several cases of appendicitis, and finding in all the bacterium coli communis. Generally this micro-organism is alone, but sometimes it is found with the staphylococcus of suppuration. D. Shoemaker, of Sacramento, ¹⁴⁷ _{July} describes the very interesting case of a man of 60, who died of croupous pneumonia. At the autopsy the vermiform appendix was found to be transformed into a cyst, although no symptom during life gave reason to sus-



CYSTIC APPENDIX.

A, distal end. B, point about to rupture.

C, point of attachment to cæcum.

(Occidental Medical Times.)

pect this condition. The cyst was four inches long and one and a quarter inches in diameter. The extremity of the appendix was not dilated, and at the point of attachment on the cæcum the canal was obliterated (see cut, page 33). This case is an argument in favor of surgical treatment, for no medical treatment could re-establish the obliterated appendicular canal. At the point B rupture was imminent, the contents resembling clear jelly, and no foreign body was to be found.

Josserand, of Lyons, ²¹¹₂₁₂ brings to notice a very remarkable case of tumor of the vermiform appendix, developed in a left inguinal hernial sac containing the cæcum. This case showed very curious features,—hernia of the cæcum on the left side, and a tumor of the appendix developed in a hernial sac. This tumor was of a fatty nature, according to Bard's histological examination. In the centre was found the appendicular canal, still permeable; it was, probably, a submucous lipoma. We learn, from the classical works of de Cruveilhier and Broca, that submucous lipoma of the intestine is rarely seen, and the fact of its localization in the appendix is, therefore, more interesting.

Richelot, of Paris, ¹⁷_{18,20,40} studies the difficulties of diagnosis between common appendicitis and tuberculous typhlitis. From his own observations he finds that diagnosis is often obscure, and that one meets with many surprises. On the other hand, tuberculous typhlitis is more frequent than is supposed, and must therefore always be thought of in recurrences. Richelot draws attention, distinctly, to a localized form of tuberculous typhlitis at one point of the cæcum, causing a small, hard tumor, without viscous surroundings. When this form is recognized it is time to interfere, and a *limited* resection of the cæcal wall may, in such a case, yield a better result than the total resection of a portion, more or less long, of the intestine. Talamon, of Paris, ³¹_{32,33} writes a noteworthy article on the causes of error in diagnosing appendicitis. Generally speaking, this diagnosis offers no difficulties; the usual clinical type is as easy to recognize as that of acute pneumonia. As for the very acute form, when, in a child or adult enjoying habitual good health, the signs of acute peritonitis are observed, the possibility of perforation of the appendix should be considered; and if these signs have been preceded by a violent attack of colic, with pain localized in the right iliac fossa, perforating appendicitis

may be affirmed. However, errors of diagnosis more or less grave have been and may be committed, the true diagnosis being obscured (1) by the initial painful attack, (2) by the phenomena of paralysis and intestinal obstruction, (3) by the general symptoms, (4) by the tumor. These causes of error avoided, there is still to be determined one chief point in reference to treatment, viz., whether or not the appendicitis is perforating.

PERITONITIS.

Work on this subject has not been wanting, but the pathology of the affection has justly received but scant attention, the greater number of the articles dealing with treatment. Although its pathology is well known, there are still several obscure points to be cleared up. The existence of idiopathic peritonitis is still much discussed. Joseph Levi, corresponding editor, of *Colon, U. S. of C.*,⁶⁷³ reports a fatal case of acute idiopathic peritonitis in an adult man, caused by the rapid ingestion of an iced liquid. The author concludes that we must attribute the development of the illness not to the action of the cold itself, but to its action on an overworked and tired individual, who suddenly loses the excess of heat acquired by overexertion.

In an important discussion before the New York State Medical Association, October 30, 1891,²⁰⁶⁶ this same idea was maintained by several physicians. W. MacCollom, of King's County, remarked that peritonitis is frequent when the winter is rigorous and the temperature changeable, especially in men exposed to inclement weather. Nicholas Senn, of Chicago, described a case in which laparotomy was performed, and which he had at first taken for tuberculous peritonitis, but in which ascitic effusion only was found, and the origin of the inflammation was not discovered. He believes in the existence of idiopathic peritonitis. The etiology of peritonitis is generally referred to microbial infection, and experimental pathology supports this doctrine. Kraft²⁰⁶⁸ has found a variety of micro-organisms in the pus of acute peritonitis (*staphylococcus aureus*, *albus*, *bacillus pyocyaneus*, *staphylococcus pyogenes*, besides a bacillus and several kinds of cocci, non-pyogenic). He has repeated the experiments of Grawitz, showing that one can inject a large quantity of pyococci into the peritoneum without producing peritonitis, if the abdominal wound be not

infected. Similar results have been obtained by Heneage Gibbs, of Michigan.²⁰⁶⁵ The experiments of Kraft show, further, that the sterilized cultures of the micro-organisms suffice to produce peritonitis. Victor C. Vaughan, of Michigan,²⁰⁶⁵ reports experiments showing that, if the peritoneum be not irritated, the injection of a watery emulsion of germs remains without effect, while peritonitis develops by injection of a sterilized emulsion of trypsin, or of croton-oil.

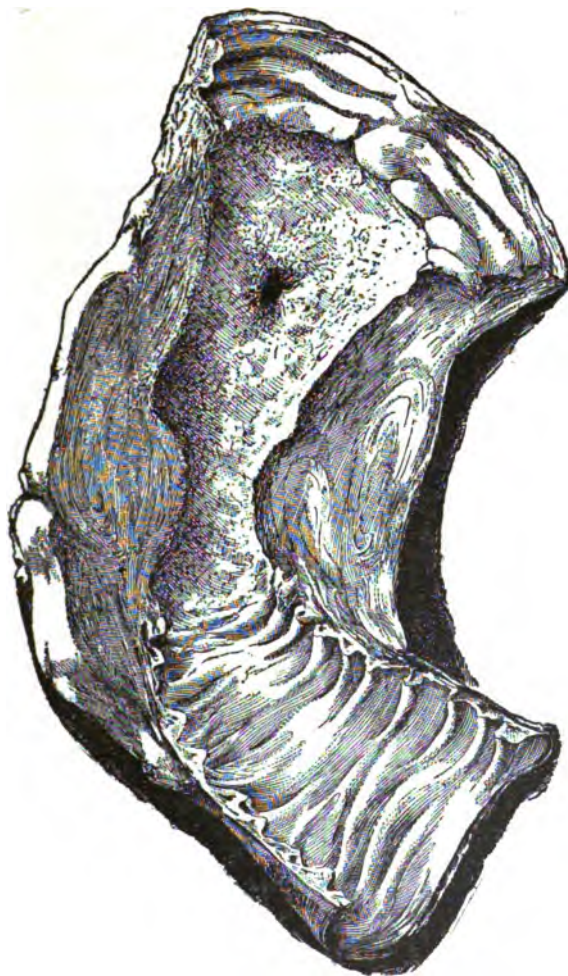
J. Lewis Smith, of New York,²⁰⁶⁵ thinks that idiopathic peritonitis undeniably occurs in children, numerous cases having been reported. In a newborn child peritonitis almost always results from microbial infection through the umbilical cord. During childhood and adolescence the acute disease might result chiefly from appendicitis and typhlitis; it may also exist in typhoid fever, intestinal perforation, and traumatism. Tuberculous peritonitis is much more frequent in the child than in the adult. Its diagnosis in the former is often very difficult.

Among the rare accidents which occur in the course of chronic peritonitis is the notable one in the case reported by Chavannaz, of Bordeaux.¹⁸⁸ The intestine, during adhesive peritonitis, was sphacelated to the extent of twenty centimetres in length. The peritoneal cavity was filled with pus; there was no trace of strangulation. The sphacelus appears to have been due to an inflammatory filament forming an obstacle to the circulation of the intestine. The majority of savants give the preference to surgical treatment, but many physicians do not accept this view.

Routier, of Paris,¹⁰ presented a young patient, aged 15, who was suddenly seized with acute peritonitis. It was thought, at first, to be inflammation of the vermiform appendix, but, incision being made, this was found to be healthy. The abdomen being full of pus, Routier made a second (median) incision and washed out the peritoneal cavity with naphthol-water; the wound was dressed with iodoform gauze, and the patient recovered rapidly.

James Bell, of Montreal,²⁸² thinks that early operative interference is necessary in peritonitis. He quotes the case of a young man who died suddenly of perforation of the gall-bladder by an hepatic calculus. The patient having previously had several attacks of peritonitis, Bell thinks that, if an exploratory laparotomy had been made, life could have been saved by cholecystotomy and extraction of the calculus.

Henoch⁶⁰ thinks that medical treatment of tuberculous peritonitis in children gives but insignificant results. As to laparotomy, its effects are not permanent. According to him, the cases in which this operation is followed by complete cure are those of



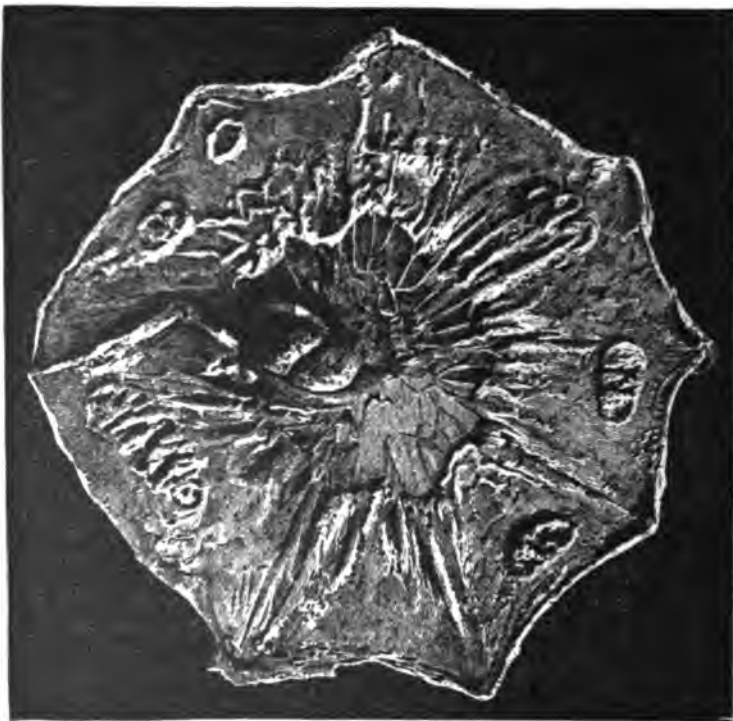
ILEO-CAECAL TUBERCULOSIS.
(*Bulletin de la Société Anatomique.*)

simple peritonitis, with false membranes simulating tuberculous granulations. Many physicians prefer the older methods, which do not expose the patient to the surgeon's knife. Manley¹² does not believe that knowledge of the etiology of peritonitis has been followed by advances in treatment, and that it is best to keep to

medical practice, calming the pain and diminishing the inflammation by opium combined with mercury. Madison Reece¹⁸⁹ recommends pilocarpine. Archibald McLaren¹⁰⁵ is in favor of opium. Gunther²¹⁴ reports a case where ichthyol was successfully employed, applied to the abdomen by a brush, and covered with gutta-percha to prevent evaporation.

TUMORS.

Commandeur, of Lyons, ²¹¹_{July 21} describes an interesting case of cancer of the pylorus in a woman, 53 years of age, attacked by

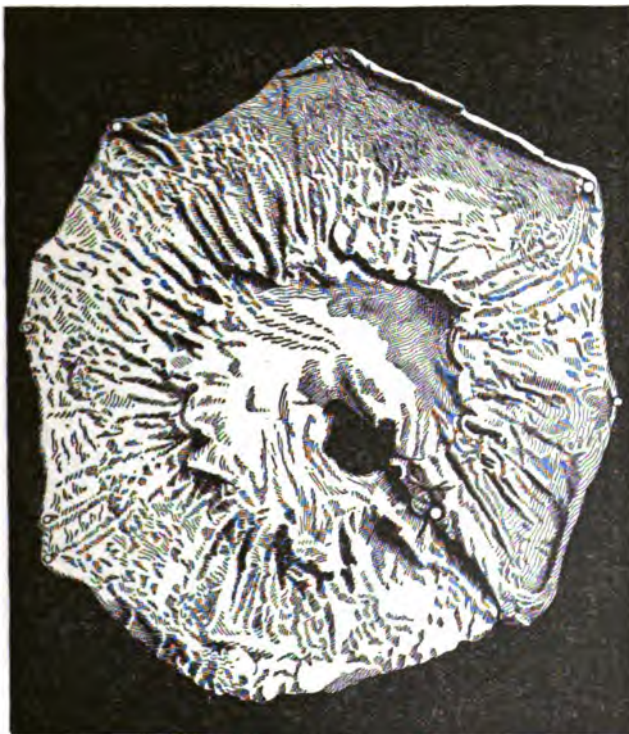


ENLARGEMENT OF INTESTINAL FOLLICLES.
(*British Medical Journal.*)

this disease, the beginning of which dated back fourteen months. It was characterized by sharp pain after the ingestion of food, daily vomitings, hæmatemesis, etc. After laparotomy Jaboulay established an anastomosis between the upper part of the jejunum and the stomach, at the level of the greater curvature. To avoid the accumulation of food *débris* in the duodenum, a second anastomosis was established between the third portion of the

duodenum and the jejunum, about 25 centimetres from the first. The operation was successful; the temperature did not exceed 38.6° C. (101.5° F.). For three days she took liquid food. The seventh day the patient ate chicken and digested it easily. The ninth day she got up. There was no vomiting after the operation. There was increase of 500 grammes (1 pound) in her weight in twelve days.

Henri Hartmann, of Paris,⁷ presents a case of ileo-cæcal

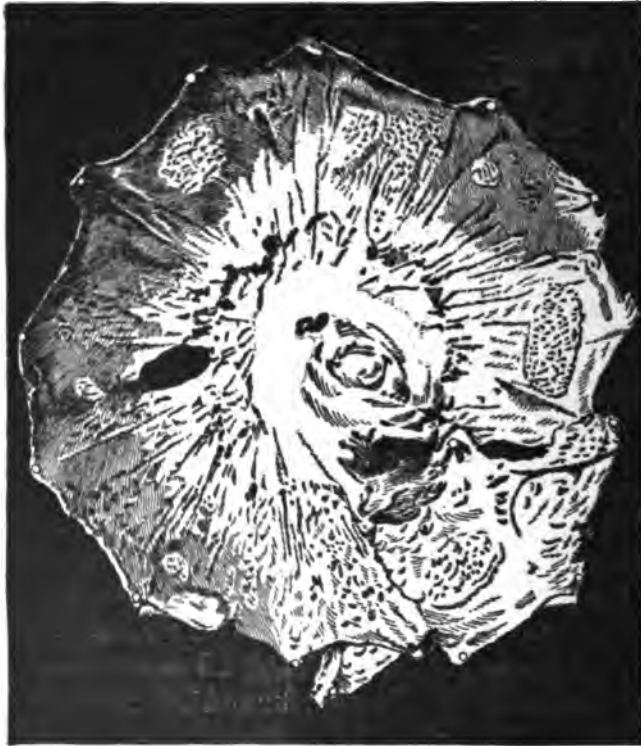


ENLARGEMENT OF INTESTINAL FOLLICLES.
(*British Medical Journal.*)

tuberculosis, analogous to those previously described by him. He shows that the special form of tuberculosis localized in the cæcum rarely tends to perforation; that, on the contrary, it is often accompanied by a considerable thickening of the walls of that intestine, *anatomically* simulating a neoplasm. *Clinically*, this tuberculosis shows itself under two forms: the one characterized by phenomena of circumscribed chronic peritonitis, the other by

symptoms of stricture of the intestine. The cut on page 37 gives an exact representation of the lesion of the cæcum.

Rolleston ² gives an example of sarcoma of the duodenum, a rather rare tumor. The mucous membrane was much changed in the second portion and at the beginning of the duodenum. The surface was elevated and covered with patches analogous to indu-



ENLARGEMENT OF INTESTINAL FOLLICLES.
(*British Medical Journal.*)

rated Peyer's patches. The tumor was ulcerated, and there was deep destruction of the tissues on a level with the biliary papilla. The pancreas was not involved; the neighboring mesenteric ganglia and those of the furrow of the portal vein were degenerated; no other ganglia were affected. The microscopical examination showed a lympho-sarcoma, starting from the submucous tunic.

Smith and Parsons ² relate four strange cases of a curious disease occurring in children below 5 years of age. These children were taken, while in perfect health, with symptoms resembling

those of tuberculous meningitis (convulsions, contractures, vomitings), accompanied by fever and increase of pulse-rate and respiration. All died. The autopsy showed no lesion of the central nervous system. The only lesion was a considerable hypertrophy of Peyer's patches, of the spleen, and of the mesenteric ganglia. It was certainly not typhoid fever, and even the nature of the disease



ENLARGEMENT OF INTESTINAL FOLLICLES.
(*British Medical Journal.*)

remains uncertain. The intestinal lesions are well represented in the accompanying cuts (pp. 38-41).

MISCELLANEOUS.

Desnos, of Paris, ⁴²⁰_{Sept. 27} reports a very curious case,—that of a young man of 17, found in the streets suffering from a nervous attack. After admission to the hospital, it was perceived that defecation was effected by the mouth. In presence of the superintendent and his assistant, he passed fæcal matter by the mouth for two days, one hour after his evening meal. This matter was formed,

dark brown in color; in fact, had quite the aspect of fæcal matter resting in the large intestine. It contained no trace of food, although the meal had been eaten only one hour before. The patient recalled that this accident happened at 2 years of age, and had commenced after a fall, followed by a wound at the level of the right iliac fossa. No doubt a communication was then established between the large and small intestines.

Oddo, of Marseilles,⁴⁶ offers some modifications of the classical treatment of lead colic, placing purgatives at the head, and recommending, especially, cholagogues and German *eau-de-vie*; jalap being one of the most active cholagogues. As regards the elimination of lead by the skin, the author thinks that sulphur baths, as ordinarily employed, are not sufficient. The skin must be cleansed after each bath, in order to take off the sulphide of lead which forms, rendering the skin impermeable to further elimination. This is done by means of an aqueous 20-per-cent. solution of hydrochloric acid, followed by a thorough soaping, and, if needed, rubbing with a brush. Elimination by the kidneys is facilitated by iodides, iodide of iron being preferable; for, during lead colic, iron is eliminated in considerable quantities.

ANIMAL PARASITES AND THEIR EFFECTS.

By CHARLES S. DOLLEY, M.D.,

PHILADELPHIA.

PROTOZOAN PARASITES—SPOROZOA ; RHIZOPODA ; INFUSORIA.

A LIVELY discussion has been kept up in the medical and scientific journals of Europe, during the past year, over the relation of coccidia to the etiology of cancer. The most important contribution is from two Russian investigators, Podwyssozki and Sawtschenko, of Kiev, ⁵⁰_{Apr. 22}, who have followed up the observations of Pfeiffer, Sjöbring, and Van Heukelom, by publishing the results of their examination of twenty cases of carcinomatous growths. They leave very little room for doubt as to the sporozoan nature of the inclosures within cancer-cells, the fal-ciform spores of which, characteristic of this group of protistic organisms, are clearly shown in the plates accompanying their admirable paper. Foà, of Turin, ⁵⁰_{Apr. 1}, refusing to accept these cell-inclosures as parasites, and denying that they are found only in cancerous tissues, describes and figures what are evidently only different stages of development of the same organisms. None of the investigators claim that the coccidia hold a specific pathogenic relation to carcinomata, but seem inclined to take a lesson from the recent history of bacteriology and to reserve their judgment for the time being. Podwyssozki and Sawtschenko offer the suggestion that the coccidia may be commensals or symbiots of the epithelial cells. The numerous criticisms and suggestions which have appeared regarding the above researches, and in opposition to the parasitic nature of the intra-cellular bodies, appear to be based upon ignorance of the morphology and life-history of the sporozoa, rather than upon any intrinsic weakness in the proof of their presence in cancerous growths. Their relation to the etiology of cancer can only be ascertained through inoculation from pure coccidia cultures, which have not as yet been satisfactorily made. ²_{May, '93}

Rosenberg⁵⁸_{№ 11, № 3, Jan.},⁵⁰ found, in the muscle of the heart of a female patient of 40, dead of left-sided pleuritis and endocarditis verrucosa, a serous cyst, 5 x 2 millimetres, which he at first took for an echinococcus cyst, but which proved not to be so, but to contain numerous sarcosporidia of the type classed by Blanchard as *Sarcocystis hominis*.

The new edition of Laveran's great work on "Paludism and its Entozoon"²⁰²⁶_№ has given rise to criticism of the author's opinion that there is no relation between the clinical character of the fever and the special form of parasite present, but that "the type of the fever is probably determined more by individual conditions than by the variety of the parasitic elements of the blood."

A. Korolko, of Tiflis,⁵⁸⁶_{№ 44, № 1, Apr. 16},⁵⁰ is not of the same mind as Laveran, but believes that he can distinguish definite forms of parasites for the different types of fever. He refers to the frequent administration of alum in malarial fever, in Russia, with conflicting reports as to its therapeutic value; after a series of trials, he concludes that it is of use only in cases of tertian fever.

Danilewsky, in a contribution to the study of the microbiosis of malaria,²⁶²_{№ 12, № 1, Apr. 16},⁵⁰ after experiments with birds, arrives at a conclusion directly in opposition to the views of Celli, Marchiafava,¹⁰⁴⁰_{№ 4, № 1} and others who deny the identity of the sporozoa of malarial fevers in man with the blood-parasites found in birds and in cold-blooded animals. He gives to the parasite of acute malaria the name of *Cytosporon malaricæ*, and refers to the blood-forming organs—spleen, marrow of bone, etc.—as the chief centres of the parasite rather than the blood itself. E. Grawitz⁵⁰_{Apr. 16} refers to the behavior of the malarial parasite in military patients on the east coast of Africa.

L. Pfeiffer's comparative investigations⁵⁴_{№ 24, № 1, July 15},⁵⁰ on the swarm spores and resting spores in coccidia infection, and in malarial fever, indicate great similarity between the coccidia and the parasite of malaria, the plasmodial stage being absent in the former. W. Kochs²⁸⁵_{№ 22, № 1, Apr. 16},⁵⁰ takes up the cudgel in behalf of the conclusions of Laveran, as to the action of quinine as a specific poison to the malaria plasmodium, which, he claims, was not understood by Binz,⁴_{№ 44, № 1} who, however, called attention to certain inaccuracies of Laveran's recent work, and reiterates his statement of many years

back, "that quinine does not cure malaria through any influence upon the nervous system, but through a weakening of the cause," to show that he has been misrepresented. T. Coronado, of Havana, ⁴⁵⁹_{No. 15, '91}, ⁵⁰_{Feb. 20} discusses at length Laveran's recent work, and concludes with the announcement that he has discovered, and will soon publish, detailed descriptions of pigmented, spherical, flagellate organisms from swampy water and soil, which he positively identifies with the malaria parasite.

Ruge ⁴⁹⁵_{Oct. 7}, ⁵⁰_{Feb. 20} reviews the literature of the morphology and biology of the plasmodium of malaria.

Arnaldo Maggiora, of Turin, ⁵⁰_{Feb. 20} makes the most valuable contribution of the year, as regards the etiological relations of *Amœba coli*, in his report of two thousand and one cases of epidemic dysentery in the province of Alexandria, Italy. His examinations of the fecal discharges discovered animal parasites—*Amœba coli* and *Paramœcium coli*—in but one case each; whereas, vegetable micro-organisms were abundant in all cases, particularly *Bacterium coli commune* and *Proteus vulgaris*. In a number of cases he found, also, *Bacillus fluorescens liquefaciens*, *Staphylococcus pyogenes aureus*, *Staphylococcus albus*, and *Bacillus pyocyaneus*. From inoculation experiments, in which cultures of *Bacterium coli commune* showed a marked septic-mycotic behavior, producing death in rats in fourteen to thirty-six hours, he concludes that there are two types of dysentery: one acute, epidemic, due to the last-named bacterium, in which he is supported by the observations of Roux and Rodet, Muscatello, Veillon, and Jayle; and another type tending to become chronic, and due to *Amœba coli*.

W. T. Councilman and H. A. Lafleur, of Baltimore, ⁸⁵⁸_{No. 3} present the results of their observations on the amœbæ accompanying dysentery. They find what they consider to be a new species, and for which they propose the name of *Amœba dysentericæ*, but which, as Stiles, of Washington, points out in his review of their articles, cannot stand, according to the rules of priority. Stiles proposes that the authors shall accept *Amœba coli*; var., *dysentericæ*.

Alfred Stengel ¹¹²_{Jan} concludes an article on the *Amœba coli*, as follows: "A general review of the whole subject, then, would seem to indicate that we have, in the amœba of Löscher, a constant associate of dysentery; that there is much reason to believe that this bears etiological relation to the disease, though the apparently

accurate observations of Cunningham and others leave considerable doubt on this point. It seems certain that post-dysenteric abscesses result from the action of micro-organisms conveyed to the liver by the amœbæ, and that the organism itself may play some part in the tissue destruction." In this conclusion Stengel is at variance with other writers, who hold the necrosis to be due to amœbæ alone.

Nasse⁵⁰_{Apr. 10} describes an interesting case of multiple abscess of the liver, attributable to the *Amœba coli*. The parasites were particularly abundant in the smaller necroses. Eugene Wasdin, of Charleston, N. C., adds another to the cases of amœba dysentery already reported. The large intestine showed extensive undermined areas, a form of ulceration which he holds, with Councilman, to be peculiar to amœbic colitis. The parasites do not seem to produce any product poisonous to the economy, nor to give rise to much pus formation; their influence seems solely mechanical; they gain entrance to the submucosa and destroy its cells. It is a process of necrosis, rather than inflammation, that is the immediate result of their presence in the bowel. The infection is referred to the drinking of unboiled surface-water, as has been shown for Savannah, Baltimore, and Cincinnati.

Joseph Eichenberg⁹_{Nov. 7} reports a case of hepatic abscess due to *Amœba coli*, and giving rise to perforation of the diaphragm and inflammation of the lung.

R. May³²⁶_{Nov. 7} describes an infusorial parasite of the colon which he calls *Cercomonas coli-hominis*. It is fusiform, has four flagella on the anterior extremity and an undulating groove reaching from the anterior to the posterior extremity; the nucleus is located anteriorly; there is no pharyngeal tube as in *Trichomonas vaginalis*. The patient from whom the parasite was obtained suffered from chronic diarrhœa.

G. Lindner, of Cassel,⁴¹_{Apr. 16, 18, 21} gives a careful *résumé* of the present state of knowledge concerning protozoan parasites. According to the observations of Ortmann and others,⁴_{Nov. 21} *Balantidium coli* appears to be, practically, limited to Northern Europe, where it is not uncommon for the peasantry to live in constant and close association with their pigs. Lindner places great stress upon the geographical distribution of *Balantidium* being determined by the formation of protective cysts or capsules in cold

climates, which, resisting the action of the gastric juice, enable the contained organism to gain its position as a parasite. The author then describes the sessile *Vorticella ascoidium*, which he discovered in Cassel in 1884, in the waste-water of the surface drains. He finds that it propagates itself rapidly on the skin of dogs and horses, causing a falling out of the hair and much irritation, and that its cysts enter the respiratory passages with the inhalations, and are to be found in the secretions of influenza cases, and, also, in the dejections of patients suffering from diarrhœa. *Balantidium coli* forms the subject of an inaugural dissertation by J. Mitter, of Kiel, ⁵⁰_{July, 19} in which the recorded cases are gathered, together with the observations of the author. The hog is shown to be the primary host of the parasite, and the pathological significance of the infusorian he considers to be very important. Careful dieting and enemata of a combination of tannic and acetic acids are recommended.

PLATODE PARASITES—TREMATODA ; CESTODA.

Fluke-Worms.—The small liver-fluke, *Distomum lanceolatum*, hitherto described but thrice as occurring in man, is the subject of a note by F. Zschokke, ⁵⁰_{Oct.,} who records a fourth instance, in which the parasites were taken from the body of a patient in the Arabian Hospital in Alexandria, Egypt.

Villeneuve, of Marseilles, ⁴⁶_{June 20, '91; Mar. 1} is doing a good work in his endeavors to bring about a full appreciation of the danger that bilharziosis may become frequent among the French soldiers in Tunis and Algeria, and, possibly, in France. Rutimeyer, in an address before the Medical Society of the City of Basle, December 19, 1891, ²¹⁴_{Sept. 15} presented an account of his experience with bilharziosis while in the Arabian Hospital in Alexandria, which corresponds with that of Villeneuve, and leads to the conclusion that this is a most serious affection. It is confined to those who do not use filtered water, and has for its geographical distribution the greater part of Africa.

Tape-Worms.—Béranger-Féraud ¹⁶⁴_{Aug. 18, '88} contributes one of the clearest and most concise reviews of the life-history of tænia, as shown in the different parasitic species in man, that has appeared in the medical press for years past. The history of the determination of the provisional and definite hosts is discussed, and the

desirability of further research in connection with the spread of *Tænia nana* and *T. cucumerina* is made apparent.

Epileptiform attacks due to the presence of *tænia* ("verminous pseudo-epilepsy"), although of rare occurrence, seem of well-marked form. According to H. Martha, ⁸⁹⁰ _{Nov., Dec., 71.} ⁹⁰⁶ _{Apr.} they may be distinguished from idiopathic epilepsy: 1. By the more gradual aura or ictus, the patient having time to choose a bed or other place on which to fall. 2. The longer duration of the convulsive period—fifteen to twenty minutes—and of the comatose period—three to four or five hours—always longer than in true epilepsy. 3. By an almost periodical return of the seizure each month, each third month, each year, every second year, while true epilepsy returns more frequently. 4. In pseudo-epilepsy there is no history of personal or hereditary nervous antecedents. As to the initial cry and biting of the tongue, it occurs in both forms. 5. The epileptic attacks cease permanently with the removal of the parasite.

The general geographical distribution of tape-worms receives special consideration at the hands of Bérenger-Féraud, of Paris, ¹⁰ _{Aug. 16.} ⁸ _{Aug. 17.} ⁷⁶⁰ _{Oct. 1} in an interesting article of twenty-two pages, which seems of such general interest as to deserve a more than usually extended abstract. After considering faulty diagnosis of species, locality, character of food, religion, etc., as affecting statistics, the various geographical regions are treated of categorically:—

Europe.—*Tænia solium* has been observed in all parts of Europe, but with remarkable differences in frequency. It is very rare in the Southeast (where Jews and Mohammedans are numerous), in Turkey in Europe, the Danubian provinces on the Black Sea, Greece, etc.; also relatively rare in Italy, France, Spain, and England, where pork, while largely used, is, as a rule, eaten well cooked. It is more frequent in Central Europe, in Germany, and in Austria, where pork is more extensively used and more frequently eaten raw, the prevalence of the parasite holding direct relation to the quantity of pork consumed; thus, it is much more frequent in Thuringia, Westphalia, Brunswick, Hesse, and Württemberg than in Switzerland or Austria. In certain districts, as Hungaria or Galicia, where there has been no official inspection of meats, there is, as compared with well-inspected districts, an apparent increase in the prevalence of this parasite; the fact being that in the latter parasitism is on the decrease, while in the former

the conditions and prevalence simply remain unchanged. The great fear of trichinosis in many parts of Germany has resulted in the more general cooking of pork, thereby decreasing the spread of *T. solium*. On the other hand, *Tænia saginata* is most frequent in Southern and Western Europe, Hungary, Turkey, Greece, France, Spain, and Portugal. It is also frequent in Russia, and seems to be increasing in England. The line of demarkation in the distribution of the two common species of tape-worms is, as might be expected, not sharply drawn; thus, in that part of Würtemberg situated in the basin of the Danube, *Tænia saginata* alone is found, while in the basin of the Neckar it is *T. solium*. In Switzerland *T. saginata* is the more frequent; according to Zäselein, in Basle, 102 *T. saginata* to 10 *T. solium*. In Zurich the proportion is 61 to 7; in St. Gall, 17 to 3. In North Germany *T. saginata* preponderates, although, according to Zencken, in Dresden and Erlangen, 17 *T. solium* to 5 *T. saginata*; but in Holstein 4 cases of *T. saginata* to 1 of *T. solium*.

In Denmark, from 1862 to 1883, the recorded cases were 42 *T. saginata* to every 6 *T. solium*; in Kiel, 2 *T. solium* to 1 *T. saginata*. The statistics quoted from Jobert (Strassbourg), Laboulbène (Necker Hospital), Jobert (Reims), Krabbe (Denmark), Cobbold and Bateman (England), Fritsch and Robinsky (Germany), and Blanchard (Italy) show that in the last fifty years there has undoubtedly been a marked increase in the prevalence of *Tænia saginata*, the figures placing it, in England, in the proportion of two cases to every thousand invalids. Our author gives no reason for this increase, which may, however, be plausibly accounted for by the increased consumption of beef throughout Europe, since the introduction of artificial refrigeration and modern facilities for the transportation of fresh meat. *Tænia nana*, discovered in 1851 by Bilharzia, in Cairo, seems to be gradually spreading over Europe. The writer refers to authorities for some fifty cases, usually among children, in Nottingham, London, Turin, Sienna, Pavia, Varesia, Catania, Marseilles, etc. A case not included in this list, and the first recorded one in an adult, occurred in St. Petersburg, and was noted in last year's ANNUAL (vol. i, F-8).

Bothriocephalus latus predominates (1) in French Switzerland, i.e., in the region of Lakes Geneva, Neufchâtel, Bienne, and Morat. It is an interesting fact that, while at the beginning of

the century, according to Odier, one-quarter of the population of Geneva were destined to be infected with this parasite some time during their lives, now it is difficult to find one case in one hundred of the population, while *Tenia saginata* is increasing. 2. The Russian and Swedish provinces on the shores of the Baltic form the second centre for *Bothriocephalus*; that is to say, Eastern Pomerania, Courland, Livonia, Esthonia, the province of St. Petersburg, Finland, and the eastern shore of Sweden as far as the environs of Stockholm. According to Zäslein, 20 per cent. of the population of these regions are affected, while on the shores of Lakes Constance, Zurich, Zug, Quatres Cantons, Thun, Brieg, and Lugano the percentage is not nearly so high. At Zurich, for instance, 10 per cent.; at Basle, 13 per cent.; at Bern, 5 per cent. In Italy it seems to be on the increase, having been reported by Franc, De la Chiaja, Parona, Petracchi, Maggi, Dubini, and Peroncito for Varesia, Pavia, Milan, and Turin. There is no doubt of the rapidity of its spread in Germany (Munich, Frankfort). As yet it appears not to have been introduced into Austria or Hungary. The Vistula forms the line of demarkation between the domains of *Bothriocephalus* and the two *Tænia*s. Thus, while absent in Danzig, it is frequent in Königsberg, and thence becomes more and more prevalent until, in the region of Kurisches Haff, all the fisher folk are, according to Schauinsland, affected. Not only do the natives of this region consume large numbers of pike and burbot, but the viscera and particularly the pyloric appendages of the latter constitute a popular remedy for gastric difficulties and a number of maladies. Passing from the sea and large lakes the parasite becomes less frequent, but, nevertheless, extends throughout Polognian Russia, and even to Moscow. On the shore of Sweden the parasite is very abundant, affecting one-quarter of the inhabitants of the province of Norrbotten, according to Magnus Huss, and in certain localities (Haparanda Bjorneborg) there is scarcely an individual exempt. At Gefle, where it occurs in the proportion of one to every fifteen of the inhabitants, it appears to have increased since 1850. *Bothriocephalus* is not rare in Denmark, and has been reported from the Island of Seeland; also from Holstein and Hamburg, particularly among the Jews. As noted in the ANNUAL (1891, vol. i, F-3), Belgium and Holland have, as yet, remained practically free from *Bothriocephalus*; England

and Scotland likewise furnished but a few cases (ANNUAL, 1892, vol. i, F-6, 7).

Asia.—No precise information is at hand regarding the prevalence of tænia in Asia. As to *Tænia solium*, the fact that pork is prohibited to Mussulmans would indicate that this parasite is not prevalent in many or large districts. It is well ascertained, however, that *Tænia saginata* is abundant throughout Asia, from the frigid to the tropic regions. In the Russian provinces inhabited by the Kirghiss, the Kalmouks, etc., in the environs of Lake Baikal; where, for example, the Buriates customarily eat raw beef, the parasite is as common as in Abyssinia. It is abundant in Syria and throughout Asia Minor, in Afghanistan, Beloochistan, and Hindostan. According to the English physicians of India, it is common in Peshawur, the Punjab, Lahore, and Bengal. Gordon, according to L. Colin, ²⁰²⁷_{Dec. 26, 75} asserts that one English soldier out of every three is afflicted with *Tænia saginata* after two years' sojourn in India. In Burma, Siam, Cambogia, and China, the worm is also extremely frequent, and the cattle nearly all have cysticerci. The author himself is authority for the statement that in Annam and Tonquin 18 to 20 per cent. of those admitted to the hospitals have this parasite. In Mongolia and Manchouria, it is very frequent. According to Schmidtmüller, nearly all the inhabitants of Java are afflicted. The Europeans are afflicted to a less degree, but present frequent cases. The Malays, living largely on a vegetable diet, enjoy comparative immunity. In Japan, on the authority of Bælz, *T. saginata* is abundant, while *T. solium* is rare. Thus far there are no statistics covering *Tænia nana* in Asia. Nothing is known of the presence of *Bothriocephalus* in the cold or temperate regions of Asia, but, according to Kobbe, the traveler Fedenko found *Bothriocephalus* in Turkestan, where, in forty-five examples of cestodes, forty-four were of this variety, one being *T. saginata*. Schmidtmüller reports this worm as common in Japan.

Africa.—This is, together with certain regions of Asia, the home *par excellence* of cestodes. Owing to the wide spread of Islamism, *Tænia solium* is not frequent. It was reported for 1866 to 1874, in Algeria, as occurring in one case to every thirty-seven of *T. saginata*. The latter is very abundant throughout all Africa; Morocco, Tripoli, and Egypt show the greatest number

of cases, one-quarter of the population of the last-named country being afflicted, according to Bremser. Algeria, Tunis, Senegal, and the entire east coast to the cape afford abundant cases, Abyssinia being the classical land of *T. saginata*. On the west coast it is frequent in Senegambia, probably from an importation of germs by negroes from the Niger basin; but, as the country becomes more densely wooded, the parasite becomes relatively less frequent. Thus, it is very rare on the gold coast and on the Gaboon, and not until approaching the Cape of Good Hope does it again begin to increase in frequency. A century ago it was reported by Sparmann ²⁰²⁸_{1748, 18} as abundant among the pastoral inhabitants of Bruntyes Hooghe. Knox, in 1819, reported frequent cases among the English soldiers of the Cape. Madagascar shows ten cases to every one thousand hospital admissions. In Mauritius and Reunion it is rarer; the medical reports for the latter island for 1870 to 1889 give 3.05 cases to each 1000 hospital patients. There are no records of any cases of *Tænia nana* for Africa, except that of Bilharz, the discoverer, in 1851, at Cairo, and that of Walter Tinnes, in 1855. No instances have thus far been recorded of the finding of *Bothriocephalus* in Africa.

America.—Tape-worms are abundant, and found to a greater extent among the blacks than the whites. In North America *Tænia solium* seems somewhat on the increase, owing to the extension of the pork industry. Nevertheless, it is, up to date, not so frequent in the United States as in Central Europe. It is very rare in Mexico. *Tænia saginata* is rare in North and Central America, Mexico, the Antilles, Colombia, Venezuela, and the Guianas. It is quite common in Equatorial Brazil and in La Plata. Of late years it has made a rapid increase in Peru and Chili. As in Africa, the parasite is least abundant in heavily-wooded regions. Spooner ⁵₇ is authority for the occurrence of *Tænia nana* in North America, and Otto Wernicke for Buenos Ayres, in South America. No instance has thus far been presented of the appearance of *Bothriocephalus* in the new world.

Oceanica.—Tape-worms are comparatively rare throughout Polynesia. *Tænia solium* is rare, notwithstanding the fact that, on many of the islands, pork is the chief meat consumed. *Tænia saginata* seems to be abundant in Australia and New Zealand. In New Caledonia the hospital admittances show 4.5 cases to every

1000 patients. *T. nana* and *Bothriocephalus* have not yet been discovered. The author first quoted (Béranger-Féraud) communicated to the Paris Academy of Medicine ¹⁰ Jan. 26, ² June 11, the result of his investigations as to the augmentation of *Tænia* in France in the last fifty years, according to which *T. solium* is being replaced by *T. saginata*, the latter entering France *via* Belgium, Switzerland, and the Mediterranean. From the accompanying table it will be seen that, from 1860 to 1870, tæniasis was not prevalent; that it increased rapidly from 1871, reaching its apogee in 1888, since which time it has gradually diminished:—

YEAR.	Tænia Cases Reported in Military Hospitals of France.	Proportion to 1000 Hos- pital Admittances.	YEAR.	Tænia Cases Reported in Military Hospitals of France.	Proportion to 1000 Hos- pital Admittances.
1860	3	0.13	1877	173	6.76
1861	3	0.13	1878	285	8.84
1862	3	0.13	1879	270	10.19
1863	3	0.32	1880	215	7.70
1864	3	0.29	1881	246	7.83
1865	11	0.40	1882	253	8.14
1866	13	0.49	1883	344	10.93
1867	16	0.52	1884	261	9.92
1868	24	0.75	1885	444	13.24
1869	16	0.66	1886	440	11.89
1870	26	0.69	1887	471	15.97
1871	38	0.91	1888	522	18.53
1872	48	2.12	1889	413	13.93
1873	101	4.47	1890	407	14.50
1874	129	5.26			
1875	106	4.50	Total . .	5479	6.82
1876	167	6.75			

Several other valuable statistical tables are given, besides a map showing the relative distribution in the different Departments of France.

At the February meeting of the Paris Academy of Medicine an interesting discussion on the subject of the above paper followed the reading of a communication from G. Colin, of Alfort, ¹⁰ Feb. 5, who disputed the statements of Béranger-Féraud. The concensus of opinion, however, seemed to favor the views of the latter, that *T. solium* is relatively rare in France, much more so than formerly, and that *T. saginata* has increased up to 1888. Colin's statement

that calves are much more frequently affected with finns than adult cattle, and that veal consequently requires closer inspection than beef, met with general approval. Blanchard, at a meeting of the Société de Biologie de Paris, contradicts the statement of Béranger-Féraud, that *T. saginata* was practically unknown in France before 1860, and refers to the plates in the works of Nicholas Audrey, Le Clerc, etc., and to specimens of the *Tænia* of the last century preserved in the French museums, to show that *T. saginata* was not only recognized, but formerly, as now, more abundant than *T. solium*. Charles C. Duryee, of Schenectady, N. Y.,⁸⁸⁹_{Mar. 1} calls attention to eight cases of *T. saginata*, in all of which the patients were relieved of severe intercostal neuralgia or undoubted Herpes zoster by tæniacidal treatment, and suggests that the presence of tape-worm is more or less frequently the causative influence in these troubles, which are but reflex symptoms of the irritation produced by the parasites. G. I. Güseff²⁸_{Sept. 11},⁵³⁰_{No. 14} reports three cases of *Tænia nana*. In one patient, a 15-month-old girl, who died during an attack of laryngospasmus, enormous numbers of adult *T. nana* were found inhabiting the lower half of the small intestine. In the other patients, a boy of eight and his sister of six, the symptoms were permanently removed by the exhibition of kamala and male fern. Filatoff⁵⁵⁹_{No. 10},⁵³⁶_{No. 14} is of the opinion that this parasite is much more frequent than is usually supposed.

F. Zschokke, of Basle,⁵⁰_{Oct. 1}, in an article on rare human parasites, shows the identity of *Tænia diminuta*, Rud., with *Tænia flavopunctata*, Wein., and *Tænia leptcephala*, Creplin. This little tape-worm, which thus far has been found but five times in the human intestine,—by D. F. Weinland,²⁰²⁹₉₈ Leidy,²⁰³⁰_{p. 187, 94} Parona,⁷³⁹_{v. 22, 94} and Grassi,²¹⁰⁷_{v. 22} and mostly in children. It occurs in various parts of the world, is not at all uncommon in the rat (*Mus decumanus*), and was shown by Grassi²¹⁰⁷_{v. 22} to have a small insect as its intermediate host.

Sutherland²⁸²_{June} exhibited, at the April meeting of the Medico-Chirurgical Society of Montreal, a specimen of *Bothriocephalus latus* from an Irish woman, resident of Canada since 1885. He was unable to fix a date for the onset of her symptoms, but he considered it likely that the patient was infected while still in Ireland. E. Sonneberg, of Upsala,⁵⁰_{Feb. 20} details the outcome of his

investigations as to the distribution of the *Bothriocephalus latus* in Sweden, and the source of its finns. He finds the parasite rare and sporadic in the southern provinces, the hosts usually being immigrants from other districts. It becomes frequent at Lake Mälär, and, following the sea-coast northward, it is more and more often met with, until, in Angermannland, it is represented by the local physicians as occurring in 10 per cent. of the population, while in the region of Piteå and Haparanda scarcely a person is free from it. As to the interior, it is very abundant about Gellivara, in Lapland, while the middle and southern inland provinces are almost free from it. The island of Gothland presents cases, but that of Oeland none. The author refers this irregular distribution to the relative catch of certain species of fish. The first larvæ examined were from the body-cavity of *Salmo Alpinus*, which is taken mostly from Lake Gefsjö, in Jemtland. Feeding experiments on their finns proved that they would not develop in man or dogs, and they received the name of *B. salvelini*, although the host of the strobile stage is not known. The intestine of *Salmo salvelinus* yielded *B. infundibuliformis* and *Cyathocephalus truncatus*. Pike (*Esox lucius*) from Åland, Lake Mälär, etc., furnished undoubted finns of *B. latus*, both in the muscles and body-cavity, being both free and encysted in the latter place, and probably removed, along with the ovaries, and distributed throughout the south of Sweden in caviar. In Norrland, *Coregonus lavaretus* and *C. albula* both furnished finns of *B. latus*, the former in both muscles and body-cavity, the latter only in the body-cavity in cysts. These fishes being often eaten raw in North Sweden, and the ova made into caviar, they undoubtedly are the source of infection to the people of that region. Sonneberg is convinced that the trout (*Trutta salar*) is never the source of infection, as he has never found them with larvæ of *B. latus*; and, as raw trout (lachs) flesh is considered a tidbit and eaten raw throughout Sweden, it would have rendered *Bothriocephalus latus* prevalent in the inner districts were it the host of the larvæ of this parasite. This conclusion is in accord with the exhaustive investigation of the parasite fauna of *Trutta salar* by F. Zschokke,⁵⁰ v. 10, Nos. 21, 22, 23, 24, who found this fish to be the host of thirty-three species of parasites, not including *B. latus*.

Kronig⁴¹ reports to the Berliner medicinische Gesellschaft

two cases of *B. latus* in young Russian women, both patients having eaten smoked pike. Virchow, referring to the rarity of this parasite in Prussia, stated that he had found *B. latus* in but one autopsy since 1875, and that in a Japanese. *Thymallus vetillifer*, *Coregonus lavaratus*, and *C. albula* are added to the list given in last year's ANNUAL (vol. i, F-6) as provisional hosts of *B. latus*.

Edward Linton and S. A. Forbes¹_{Nov. 14, '91} are reported as having discovered finns in the fishes of the Yellowstone Park, which may prove to be similar to those reported from Loch Katrine, in Scotland (ANNUAL 1892, vol. i, F-6). The discoveries referred to are described in papers by E. Linton "On Two Species of Larval *Dibothrium* from the Yellowstone National Park"²⁰³¹_{v. 9, No. 120} and "A Contribution to the Life-History of *Dibothrium cordiceps*, Leidy, a Parasite Infesting the Trout of Yellowstone Lake,"²⁰³¹_{v. 9, No. 121} in which the author, holding with Zschokke the synonymy of *Dibothrium* and *Ligula*, still decides, for convenience, to name the finn which he discovers in the body-cavity of *Catostomus ardeus*, J. and B., *Ligula catostomi*, although he grants the species to be identical with the European *L. simplissima*. Encysted finns of *Dibothrium cordiceps* were found in the muscles and body-cavity of *Salmo mykiss*. The pelican (*Pelecanus erythrorrhynchus*), which feeds on the fish named, was found to be the host of the sexual form of the parasite.

Dehio,²¹ reports to the medicinische Gesellschaft zu Dorpat a case of pernicious anæmia due to the presence of *B. latus*. The case was interesting as showing not only a relative diminution of the number of red blood-corpuscles, but a very marked reduction in the amount of blood. Dehio attributes this form of anæmia not to the presence of a living cestode, but to the absorption of toxic substances originating in the death and decay of the worm.

Tænia Remedies. — Laborde,¹⁰_{Jan. 29, July}¹¹² recommends, very highly, the salts of strontium (lactate, tartrate, phosphate) in the treatment of tape-worm, experiments with dogs having given uniformly satisfactory results. He employs (*e.g.*) lact. strontium, 20; glycerin, q. s.; water, 120; giving $\frac{1}{2}$ -ounce (15.5 grammes) doses every morning for five days.

A correspondent¹⁸⁶_{Apr.} calls attention to the tæniacidal effects of cocaine. A patient suffering from persistent vomiting was given

hypodermatic injections of cocaine ($\frac{1}{4}$ grain—0.008 gramme) every three hours, with the result of causing the expulsion of a tape-worm on the second day and a complete cessation of symptoms. The presence of a worm was not suspected.

Katayama and Okamoto,²⁰⁰ call attention to twenty-five cases in which the administration of male fern was followed by either temporary or permanent amblyopia. In each case the dose had been about 10 grammes ($2\frac{1}{2}$ drachms). It is interesting to note that no cases of visual disturbance have been noticed until within the last ten years, probably because larger doses are now given. J. C. Stephens, of Valparaiso, Nebraska,²⁰² reports the unexpected tæniacidal action of cascara sagrada, four specimens of *T. solium* having been voided by a patient, who had been put on small daily doses of this drug, within two weeks of beginning the treatment. The son of this patient was likewise relieved of a worm of the same species by similar treatment. F. H. Lutterloh, of Anthony, New Mexico,¹⁶¹ states that the eating of half of a pine-apple caused the expulsion of a tape-worm.

Cysticercus cellulosæ.—Perrin³ reported a case of cysticercus and *T. solium* in a patient at one time. The cysticerci were mostly subcutaneous, and no serious effects followed. The small tumors were treated by simple puncture, aspiration, injection of iodine, galvano-puncture, and electrolytic acupuncture, all with equally successful results. Feletti, of Catania,⁵⁷ reports a case of multiple cysticerci with severe brain symptoms. The patient was placed, for several days, on 1- to 3-gramme (15 to 45 grains) doses of ext. male fern, in all 10 grammes ($2\frac{1}{2}$ drachms), whereupon immediate decrease in size of subcutaneous tumors was noted. Another case showed thirty-four cysticercus tumors, scattered over the body, of twenty months' duration; being placed upon 0.4-gramme (6 grains) doses of ext. male fern daily, in all 24.5 grammes ($6\frac{1}{4}$ drachms), the tumors were reduced from the size of an olive to that of a wheat-kernel. F. Zschokke, of Basle,⁵⁰ and Max Richter, of Prague,⁸⁸ ⁵⁰ each reports a case of *Cysticercus cellulosæ*.

Echinococcus.—H. Vierordt¹³³ has carefully gone over the history of the occurrence of echinococci in Würtemberg from 1836 to 1889, with the result of finding sixteen cases, to which he adds two of his own. Eight patients were men, two young children.

Cystic echinococcus occurs throughout Germany, as does the multilocular form, and with about equal frequency; for Württemberg, twenty-one of the latter to seventeen of the former.

Mangold, of Tübingen,⁵⁰ reports three cases of multilocular echinococcus, occurring in his clinic during the past four years. In all the cases the parasites were in the liver. He is inclined to think that the cysticerci of the unilocular and multilocular forms of echinococcus are different, an opinion based upon the geographical distribution of the parasites, the former being, according to Mangold, cosmopolitan, the latter limited to Germany, Switzerland, and Austria. Two successful feeding experiments were made on dogs. J. J. Kinyoun, of New York,²⁰⁸² presents the clinical history and results of autopsy in the case of a Swede having echinococcus of the kidneys, liver, and bladder. H. H. Mudd,⁵⁰ summarizes the clinical history of a case of *Echinococcus polymorphus* of the brain, as follows: Swelling over right Rolandic region; hemiparesis, with tremor; left-sided hemianopsia; choked disc; removal of echinococcus cyst followed by hernia cerebri, accompanied by high temperature; disappearance of both by pressure; complete recovery. M. W. Schulten and E. A. Homen, of Finland,^{498 50} report a case of echinococcus of liver and mesentery.

NEMATODE PARASITES—FILARIA; TRICHINA; DOCHMIUS · ASCARIS;
RHABDITIS.

Otto Leichtenstern, of Cologne,⁵⁹ ² after numerous experiments, is convinced that nearly all individuals in whose fæces Charcot's crystals are found are the hosts of intestinal worms (*Ascaris*, *Trichocephalus*, *Oxyuris*, *Tænia*, *Anchylostoma*, etc.), and, though entozoa might be present without giving rise to Charcot's crystals, they are the most frequent cause of the presence of these crystals in the intestinal evacuations. Their presence is, therefore, of great diagnostic value. S. S. Grusdieff, of Kostroma, Russia⁵⁸⁸ examined microscopically the dejections of 260 school-children of his neighborhood, ranging from 9 to 18 years of age. Of these, 141, or 54 per cent., were free from intestinal parasites, while in the others were found, in each instance, one, often two, and once three forms of worms,—86 *Ascaris lumbricoides*, 44 *Bothriocephalus latus*, 6 *Trichocephalus dispar*, 6 *Oxyuris vermicularis*, and 1 *Tænia solium*.

Filaria sanguinis hominis.—Enrique Lopez, of Havana, ⁷⁷⁸_{Dec. 5, '91} describes a filaria from the interior chamber of the eye. He does not identify the worm with any described species, but, from its comparatively small size, 25 millimetres, it approaches most nearly to *F. loa* or to *F. inermis*, described by Grassi (*vide* ANNUAL, 1888, vol. i, p. 394). S. W. Lambert, ¹⁵¹_{May} reported to the New York Pathological Society a case of filarial chyluria in a young man of negro descent, a native of Santa Cruz. Moty reports ⁹¹_{Jan} six cases of lymphatic varix in the groin and scrotum, due to filaria. Patrick Manson, ²_{Feb. 1, '91} is quoted as giving the following directions for the preparation and preservation of slides of blood for examination for these parasites. If blood, about half a drop, is spread out in a thin film on a glass slip and allowed to dry slowly, without cover-glass, it may be stored away for an indefinite time and examined at leisure; the only subsequent preparation necessary for the detection of the filariæ being the immersion of the slide in a weak solution of fuchsin—1 drop of the saturated alcoholic solution to an ounce (30 grammes) of water—for an hour or two, and then getting rid of superfluous stain by washing in a weak dilution of acetic acid,—2 or 3 drops to an ounce (30 grammes) of water. In slides so prepared the filaria alone retains the stain and is thus readily discovered. The cases of indigenous filarial disease reported by Austin Williams, of Liverpool, ⁶¹_{July 1} and by R. M. Slaughter, of Virginia, ⁹_{Dec. 1, '91} have enlarged the bounds of this variety of indigenous parasitism to and beyond the thirty-eighth parallel of north latitude. Solomon Solis-Cohen, of Philadelphia, is reported ⁶¹_{July 1} as having a case of filarial chyluria in a colored boy from St. Thomas. Cohen made use of a placebo remedy (aqua menthæ piperitæ), which to the mind of his patient exhibited “the startling virtue” of clearing up the milky urine at the end of a week. Conflicting testimony as to the efficacy of thymol in filariosis comes from Surgeon-General Colonel E. Lawrie, ⁶_{Feb. 14, '91} and Walsh, ²⁰⁶_{Dec. '91} both of Calcutta. According to the experience of the former, thymol, in doses of 1 to 5 grains (0.065 to 0.32 gramme), causes the parasites to disappear from the blood; while the latter administered thymol to the limit of toleration (up to 200 grains—13 grammes—daily) without the slightest effect on the parasites, which also resisted heroic use of creasote and gallic acid. Surgeon-General Maitland, of India, ²⁰⁶_{Oct. '91} strongly recommends the

removal of the affected lymphatic glands in cases of filarial disease. He records a case of extirpation of swollen glands from the groin of a Hindoo student, who after two years reported himself free from the periodical fevers or any swelling.

Hydrogen is recommended¹⁰ as a therapeutic agent of great efficacy in the treatment of filariosis

Filaria medinensis.—The case reported by Antonio Martinez, of Barcelona,⁵¹⁶ ²¹¹ ⁶ in which swellings in the groin became inflamed, and, sloughing away, liberated a number of worms, was probably a case of *Filaria medinensis*, instead of *Ascaris lumbricoides*. Persy Randall, of London,⁶ and Edg. Hillier, of Raichur, India,²³⁹ report cases of this parasite. In that of the latter, a Guinea worm, nearly three feet long, was removed from the tongue. The editor of the journal, citing this rare situation, records another, in which castration was performed for a supposed case of enchondroma of the testicle, but in which the hardening proved to be due to an imbedded worm.

V. Linstow, of Göttingen,⁵⁰ in a review of the work on *Filaria*, by S. de Magalhaes, of Rio de Janeiro,²⁰³³ gives a concise review of the history of the discovery of filariosis, and criticises the use of separate specific names for the adult and larval forms of one and the same parasite (*F. Bancrofti*). He furthermore points out the striking similarity of this parasite to the *F. immitis*, described by Leidy as frequent in dogs in the tropics, being found in the blood, especially at night, and which, according to Sonsino, of Pisa,²⁰¹⁴ demonstrated, was sucked up with the dog's blood by the ectoparasites *Hæmatopinus piliferus* and *Pulex serraticeps*. This same resemblance was pointed out by Moty.⁹¹ Magalhaes recognizes⁵⁰ this resemblance, but points out specific differences.

Trichina.—A somewhat acrimonious discussion of the healthfulness of American pork has gone the rounds of the German medical press,⁹³⁰ ⁶⁹ ²⁰³⁵ culminating in an authoritative article by Carl Fränkel,⁶⁹ ⁶¹ in which he gives a tabulated statement of the results of examinations of both American and German pork from 1878 to 1883, in Hamburg, showing that a far greater percentage of American pork than of German is trichinous. Out of 335,819 pieces of American pork examined, 3270 were trichinous; while out of 304,619 pieces of German pork, but 8 were infected.

Notwithstanding this greater relative frequency of trichina in the American product, nearly all the cases of trichinosis in Germany are directly traceable to meat of home production. The pickling, or salting, and curing processes employed in the preparation of American pork for export result in the destruction of the parasites; "Das ganze Unheil kommt von einheimischen Schweinefleisch." According to Wasserfuhr,⁶⁹ statistics show that trichinosis prevails mostly among the inhabitants of upper Bavaria, where the custom of eating raw meat is more prevalent than in other parts of Germany. H. Friis¹⁰⁴¹ gives a statistical report of the prevalence of trichinosis in Denmark, where it is shown that the swine are not frequently trichinous, although the rats from many localities are the hosts of the parasites. C. R. Watkins, of Marcelena, Texas,¹⁷⁶ reports eight cases of trichinosis in one family, all recovering. Ortez de la Torre⁶³² reports the case of a man of fifty, of robust constitution, and no sign or history of syphilis or tuberculosis, whose tongue was removed on account of an ulcerated tumor, which was diagnosed as epithelioma, but which proved to be due to trichinosis, the process having caused sclerosis and ulceration around the cysts.

It would seem, from the communication of Frank H. Drew, of Shelbourne Falls, Mass.,⁹⁹ that there have been no cases of trichinosis reported for Massachusetts for some fifteen or twenty years, and that the outbreak in the hill-town of Colrain, Franklin County, Mass., exceeds, in the total number of cases and the number of deaths, any previously recorded outbreak of the disease, at one time and place, in the New England States. The epidemic occurred among the employés (mostly Austrians or Germans from Bavaria or Würtemberg) of a cotton-mill, in July and February, 1892. Altogether there were at least fifty cases, with four deaths. From inquiries made, it seems that the trichina ingested were contained in cheap Bologna sausages, obtained by the local butchers from Chicago. Drew remarks that, since the government has established an official laboratory in Chicago for the examination of pork intended for export, a larger proportion of trichinous meat will be sold in the American market, and the disease will be likely to prevail to a greater extent than heretofore. The pork condemned as unfit for exportation, it is said, is worked up into cheap sausages, which were the probable cause of this epidemic.

In the discussion of Drew's paper by J. H. McCollum, reference is made to some one hundred and twenty cases of trichinosis, reported in America since 1864, with sixteen deaths. McCollum prefaces his remarks with a historical *résumé* of the discovery of trichina, in which he fails to record the fact that the parasite was first discovered in the hog by the eminent American helminthologist and former editor of this department of the ANNUAL, the late Dr. Joseph Leidy, in 1846.²⁰⁰_{p. 159, 160} The prediction of Drew, noted above, seems to have its first consummation in the fifteen cases of trichinosis reported by C. W. McDonald, of Boston,⁹⁹ and in the two cases of L. N. Livesay, of Patoka, Ill.¹³⁹ A. M. Lewin⁵⁹⁶_{no. 14, vii; no. 25} points out that trichinal myositis has its seat entirely in the muscle elements, whereas anthrax myositis is confined to the connective tissue, the *perimysium internum*.

Dochmius (Anchylostomum).—G. M. Giles²⁰⁶_{Feb., July 25} finds that the disease known as *beriberi* and the *kala gar* of Assam and Ceylon are identical, and that they are in reality dochmiasis (anchylostomiasis) caused by *Dochmius duodenale*, in which he but confirms (see, especially, the paper presented by A. W. Sinclair²_{Dec. 12, vi} to the Pathological Section of the British Medical Association Meeting, at Leeds, in 1889) previous investigation (ANNUAL, 1890, vol. i, F-23). Giles finds, as others have done, that this parasite develops slowly, if at all, in drinking-water, but very plentifully in *fæces*. The ingress of the parasite into the human system, in the East, is believed to be due to the habit of cleansing kitchen and table utensils with infected earth and of eating food from a mat on the ground. W. Leopold,⁴_{no. 1, May 18} in an article on the pathogenesis of *beriberi* (in Japan called *kakke*), claims North Brazil as the father-land of the disease, from which, he holds, it has been spread by commercial intercourse with other nations. He distinguishes two forms, the œdematous and the paralytic, and isolates four forms of bacteria from the blood of *beriberi* patients, but makes no reference to the presence of *Dochmius*. Julius Zappert, of Vienna,⁸_{no. 11} contributes his observations as to the presence of dochmiasis (anchylostomiasis) in Austria and particularly in the mining region of Bremberg.

Ascaris.—C. W. Stiles, of Washington,⁹²⁷_{no. 4, vi} after examining a large number of embryos of *Ascaris lumbricoides*, *A. megacephala*, etc., decides that the so-called perforating tooth at the

anterior extremity of the embryos of these worms, and which has led many zoölogists to believe that ascarides must have an intermediate host, is, in reality, but the homologue of the three lips of the adult ascaris. Langer, of Prague, ⁸⁸ _{Nov. 6, 71}; ⁵⁰ _{Nov. 7, 71}, has investigated the relative frequency of entozoa in country and village children, and finds 57.31 per cent. of the former and 16.66 per cent. of the latter infected. The most frequent parasite of country children is *A. lumbricoides*, 52.03 per cent.; next, *Trichocephalus dispar*, 14.63 per cent.; *Oxyuris vermicularis*, 7.31 per cent. Among village children the most frequent form is *Oxyuris vermicularis*, 11.11 per cent. George Yardley Taylor, a resident missionary physician of China, ²⁸⁵ _{Mar.} writes of a case very similar to that described in the ANNUAL for 1892 (vol. i, F-16), also from China. The patient in Taylor's case, a woman, apparently had a very mild localized peritonitis of the umbilical region, from which she recovered in a few days. A week or so later the abdominal wall at the same place became tender, red, and hard, and an abscess formed, from which, ultimately, were discharged pus and a worm, described by the woman as being of the lumbricoids, so common in China. Since that time several more worms have found egress through the same fistula, always singly. Th. Hensser, of Wädensweil, Switzerland, ²¹⁴ _{July 18} places on record a case of sudden death of a child, due to the presence of an ascaris, which had reached the pharynx and been drawn by inspiration into the trachea, lodging at the bifurcation. A very similar case is described by Lacaussade. ²⁴⁸ _{Mar.} The patient was a soldier, and died suddenly, with symptoms pointing to intestinal irritation. The autopsy showed the small intestine blocked by a mass of ascarides, and a worm presenting a macerated aspect within the glottis.

F. S. Parsons, of Boston, Mass., ¹⁸⁶ _{Mar.} records a case of a woman, aged 25, exhibiting all the symptoms of gastric ulcer, localized epigastric tenderness, pain, and repeated hæmatemesis, accompanied by extreme collapse. On the fifth day of treatment, a large, living ascaris was vomited, after which, under doses of nitrate of silver, a rapid recovery was made.

Prospero Dermateis ⁵⁰ _{May 18}; ³¹ _{July 20} calls attention to the frequency with which ascarides are expelled by the influence of high fever. Cases of hepatic abscess due to ascarides are of exceptional occurrence, the disease being caused most commonly by alcoholism (up

to 67 per cent., according to Waring), traumatism (27 per cent., according to Baerensprung), pyæmia (from 6 to 15 per cent., according to Waldeyer and Baerensprung)—(see ANNUAL, 1892, vol i, F-17; 1888, vol. i, p. 392), and by *Amœba coli* (see reference on page 4).

V. V. Rosenblatt, house-surgeon to the Vilna Military Hospital, ⁵⁹⁶ ²⁶ _{Nov. 27; Sept.} presents the facts of a case of purulent hepatitis caused by the penetration of round-worms into the ductus choledochus. The occurrence may be extremely rare; nevertheless, it can take place in any given host of round-worms. Hence, cases like Rosenblatt's must be regarded as additional evidence in favor of the proposition that helminthiasis constitutes a serious affection, and must be diagnosed and appropriately treated as early as possible. The same moral is enforced by two cases recently published by V. F. Büshüieff, of Kiev, and F. V. Bükoiemsky, of Tarantcha, ⁵⁹⁸ ¹⁰⁹ _{Nov. 25, 27; Sept.} in which ascarides gave rise to a reflex cardiac and respiratory paralysis, ending in death. ²⁸ _{Aug. 70; Aug.} The experience of the latter shows the necessity of anthelmintic treatment in all cases of infantile typhoid complicated with sudden attacks or fits, accompanied by cardiac or respiratory failure. In thirteen cases, the administration of from $\frac{1}{2}$ to 2 grains (0.032 to 0.130 gramme) of santonate of sodium brought away worms and stopped the attacks.

Thermes, ³ _{Sept. 31} calls attention to the frequency with which intestinal parasites are found to be the cause of irritative or toxic phenomena, always general troubles of a neurasthenic, hysteriform, epileptiform, or choreiform nature, and occurring usually in subjects offering no neuropathic antecedents. There can be no doubt of the importance of an examination of the fæces, for ova, in all obscure cases presenting reflex neuroses.

Demme, of Bern, ²⁰¹⁴ ² _{vi; Mar. 28} calls attention to the danger of administering large doses of santonin to small children. He recommends that the doses given children from 1 to 6 years should not exceed $\frac{1}{8}$ to $\frac{1}{2}$ grain (0.011 to 0.032 gramme) in each dose, or 1 to $1\frac{1}{2}$ grains (0.065 to 0.097 gramme) in a day.

M. Voucka, ⁴⁵⁴ _{July} reports a case of prolonged coma which absolutely resisted all treatment until relieved by the passage of a knot of ascarides, after which complete and almost immediate recovery ensued.

The anthelmintic properties of naphthol and naphthalin, as recommended by various writers^{230 211} (also ANNUAL, 1888, vol. i, p. 385; 1890, vol. i, F-12; 1891, vol. i, F-9; 1892, vol. i, F-10, 15), is denied by C. Lazzaro,^{477 589} as the outcome of a series of carefully-conducted experiments upon living worms. He asserts that its only action is to increase peristalsis. The fruit of various species of Embelia has frequently been recommended as a vermifuge (ANNUAL, 1890, vol. i, F-12),^{237 2087 206} which property appears to be due to an acid which contributes its power to its derivative salts. Thus Giusto Coronadi,^{477 169} having made experiments with the embelate of ammonium, finds that it is more poisonous for the worms and less poisonous for the host than either santonin or pelletierin.

Rod-Worms.—Ilbery and Gerhardt, of Berlin,⁶⁰ communicated an interesting series of observations on the life-history of *Anguil-lula intestinalis*. The patient, who complained of rheumatic pains in the limbs, had but recently returned from the Dutch East Indies. He was found to have plasmodia in the blood, and the fæces showed Leyden-Charcot crystals, together with eggs of Dochmius and larvæ of Tricocephalus and *Rhabditis stercoralis*. Larvæ of the latter were carefully reared in a culture-oven, and developed into sexually mature male and female animals, from 0.7 to 1 millimetre in length. After thirty hours in the brood-oven at 28° C. (83.6° F.), the females produced numerous eggs, from which embryos were again developed as follows: in the course of a few days they lose their original form, *i.e.*, that in which they occur in the fæces, and, finally (in, say, six days), assume a filaria-like form. This stage the authors consider the infectious form; living free in soil and water, they are taken into the human intestine along with water or fruit. In the intestine they grow to the parasite *Rhabditis intestinalis*, which is longer but more slender than the sexually mature stage which develops outside the host (*R. stercoralis*). The former is rarely found except in autopsies, as it adheres with great tenacity to the intestinal wall.

Gerhardt cites Normand, a French army-surgeon, as having been the discoverer of *R. stercoralis*, in Toulon, in soldiers returning from Cochin China, and for quite a long time it was considered to be the cause of Cochin-China diarrhœa.

PSEUDO- OR FACULTATIVE PARASITES—FLY-LARVÆ, ETC.

M. A. Goldstein, of Missouri, ⁶¹_{Apr. 9}, ¹_{July 9}, records the lack of success he has had in the use of drugs in destroying the larvæ of the Texas screw-worm, *Comptosmyia macellaria*, surgical means offering the only resource. H. O. Jewett, of Cortland, N. Y., ¹_{Nov. 21, '71}; ⁷⁶⁰_{Dec. 12, '71} describes specimens of rat-tailed larvæ (*Eristalis*) from the human intestine. Jewett is the first, so far as we know, to call attention to this larva as a pseudo-parasite of man. The fly is not a native of this country, although becoming rapidly quite common; it is a well-known European species, the larva being known to the Germans as "Rattenschwanz larven," and to the French as "Vers à queue de rat," occurring frequently in putrefying materials, dirty water, sinks, drains, mud, etc. About Philadelphia it is frequently met with in rain-water barrels standing out-of-doors and catching water from the eaves. The fly appears early in the autumn, resembles a honey-bee, and flies with a loud, humming sound. Conrad Alt, ⁸⁴_{July '71} furnishes an interesting account of the pigeon-tick (*Argas reflexus*) as a parasite of man. An examination made by Hugo Engleman points to the conclusion that the poison of this mite is a toxalbumen. There are several species of mites which become very troublesome to man: the "Malleh de Mianeh," or the "Punaise de Mianè," long known and dreaded by the Persians; the "Gar a pates," or "Telajes," of Central America; and *Argas Americanus*, found along with the common Texas cattle-ticks. It is said that rubbing the skin with benzin or turpentine will prevent the attacks of these pests. Herbert Osburn ²⁰⁸⁹_{Nov. 7, '71} describes the "Pediculi and Mallophaga affecting Man and the Lower Animals," some sixty-five species in all, of which he contributes six new ones. Cooper Curtice ⁴⁸²_{Oct. 7}; ⁵⁰ gives a list of the ecto- and ento-parasites found by him in man and domestic animals in America.

DISEASES OF THE KIDNEYS, BLADDER, AND SUPRA-RENAL CAPSULES.

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SALIENTES.

THE department I have undertaken to write for the ANNUAL covers so much ground that the mere enumeration of the subjects accumulating during twelve months were, of itself, no inconsiderable task. I have endeavored, after careful perusal of the many papers which the editor-in-chief has submitted to me, to give a fair notice and epitome of those which are of importance, while some which are of major importance have been reproduced at considerable length, the matter they contained seeming to admit of no curtailment.

Before, however, entering into these details, I have acted upon a suggestion of the editor-in-chief, that it might be convenient to readers if, while the subject was fresh on my mind, I brought forward a bird's-eye view of the salient points which have been open before me in the course of my study of the details. After such an effort as that which is necessary for the purpose of bringing these details into form, the mind naturally learns to appreciate the subjects upon which it has rested in their general acceptation; and, while everything is fresh on the memory, it becomes a comparatively easy task to place before others a chapter which shall save a considerable amount of labor, and enable busy men to follow more clearly the particular records submitted and glean from them the lessons which they convey. This chapter of *salientes* will, therefore, be no digression; nor will it interfere with the after-readings of those who want such a department as this for date, reference, and detail.

In order to facilitate the references to the facts on which these short comments are made, I have added the number of the page or pages of the after-report upon which the comments themselves

(F-1)

are based. I have also ventured to add a few short notes bearing upon the subjects under consideration, derived from my own personal observations and inquiries made at the bedside in hospital ward, in private practice, and in the laboratory, so as to carry out, to the fullest extent at my command, the advice of Dr. Freund: "Every physician ought to make observations from his own experience, but he will be able to make a better judgment and juster observations by comparing what he reads and what he sees together."

Points Relating to the Estimation of Albumen in Urine and Albuminuria.—Some advance has been made, in the course of 1892, in the matter of test for albumen. Heat, nitric acid, or the two combined, for testing, still hold first place. But a good suggestion has been made,—that when moist albumen is precipitated in the test-tube, the amount that is presented should be spoken of as the amount by bulk of moist albumen. At page 92 will be found a new test for albumen (Jaworowski's ammonium molybdenate test), which is simple and answers well. It is claimed for it, that it detects $\frac{1}{800}$ of albumen; but the better value of it lies in the fact that, by the careful repetition of it in small quantities, the albumen can all be removed from the specimen of urine under examination. It will probably be easy, in this way, to make a good quantitative as well as qualitative test.

The Term "Bright's Disease."—The term "Bright's Disease" is now no longer being accepted as indicative of one particular pathological condition. When the term was first applied, it was assumed invariably that the mischief giving rise to the presence of albumen in the urine was located in the kidney; and I remember well that, even when a post-mortem examination did not explain sufficiently the characteristics of renal disease, and did not, in fact, account, through the kidney, for the phenomenon that had been observed during life, it was still supposed that the kidney was the organ at fault, the hypothesis being that, whenever albumen passed by the urine, the fault must lie exclusively in the kidney itself. This view held its ground until a few years past, but lately, and especially since the labors of Sutton, and the conception that confirmed albuminuria is often traceable to what is called arterio-capillary fibrosis, it has become common to speak of albuminuria as a disease connected with different causes,—in short, as a disease

of many types. Some authors, I observe, are inclined to maintain the term "Bright's Disease" with a limitation. They would call that only "Bright's Disease" which is attended with distinct change of renal structure. What that change of structure may be is not defined with special care; but if there be albumen with an obvious disease of the kidney, that may still be called "Bright's Disease," or, as the French say, *albuminurie brightique*, as if signifying a state qualified by an adjective, and as if the origin of the adjective in the name of a discoverer had passed away. Instead of the term "Bright's Disease," therefore, as covering one specific pathological condition, we speak now of albuminuria of different kinds, each pertaining to some particular cause. I find, in this manner, from the writings of observers in the year 1892, no less than nine classes of albuminurias:—

1. It seems now to be generally accepted that there is a form of albuminuria in which there is no renal disease whatever, nor actual organic disease of any other organ of the body, but a physiological state, during which albumen passes by the urine, as if the act were natural and dependent upon some very simple physiological change. It would appear now that, in certain violent forms of exercise, albumen passes with moderate freedom by the urine—as, for instance, after drill to which soldiers are subject, after fencing, after hard riding, and after labor of a muscular kind of any sort. This is called, by some authors, physiological albuminuria; by others it has been called cyclic, but it can only be called cyclic with propriety in this sense—that it is incident to some condition periodically carried out by the person in whom it is observed. It would be well, therefore, to drop the word "cyclic," and to use preferably the word "physiologic," for want of a better term. The cause of the albumen after violent exercise is, in fact, physiological. It is due, probably, first to the change of elimination which takes place under the free action of the skin; and, secondly, to the increased pressure of blood upon the arterial system. In some of my own researches, conducted in the course of last year, on "Effects of Pressure" and on "Vital Hydration,"^{v. 9, No. 24} I have shown that the transudation of water from animal tissues under pressure is modified largely by the presence of a saline constituent like common salt or like urea. I have also shown, by previous experiment on dialysis, that the presence of a saline may be such as to cause albu-

men, which would otherwise be precipitated on the dialysing membrane, to pass through the membrane with the saline. There is, therefore, no difficulty in understanding that, under the excitement of extreme exercise, accompanied with a rapid muscular action and increase of urea, there will be a transudation of albumen from the kidney into the urine; and this entirely for physiological reasons. We may, then, very satisfactorily accept this division of albuminuria and call it the physiological.

Connected with this, another observation has been made which is of moment. It has been shown that, after epileptic seizures, albumen is detectable in the urine, and is sometimes found in large quantities. We may consider here that the same change is taking place as under exercise, and that, although the muscular motion is unnatural, the phenomenon of the presence of albumen in the urine is not connected with the basic pathological state upon which epilepsy depends, but simply upon the increased exercise and pressure caused by the excessive muscular agitation and work.

2. The second form of albuminuria has been called "cardiac," depending, as it does, not primarily upon kidney affection, but upon some derangement in the heart. Different observers name different states of cardiac disease as giving rise to this class of case. One gives cardiac hypertrophy; another, mitral obstruction; a third, cardiac failure; but all mean really the same thing in respect to effect. They mean that the circulation through the kidney is primarily influenced from the centre of the circulation, and that the albuminuria is really brought about by a purely mechanical cause. It will remain yet to be discovered how large a percentage of cases of albuminuria is to be accounted for in this manner. Usually speaking, there is found after death, in these cases, some kidney lesion, and, although the inference may be correct that such lesion is dependent upon cardiac disturbance, it is perhaps the fact that no sufficient number of instances of the kind has occurred to establish, absolutely, the statement that there is a true cardiac albuminuria, pure and simple.

3. There is a class of albuminuria dependent upon toxic agents, and called, therefore, toxic albuminuria. Alcohol, mercury, phosphorus, and lead, acting as poisons upon the body generally, are set down as cases of this particular kind. Opinions incline to differ as to whether the agent, carried to the extent of producing

these effects, acts primarily through the blood, or does not act until a specific organic change has been produced in the kidney itself. The fact of the existence of this class of cases is, however, in a general point of view, beyond dispute.

4. What may be called febrile albuminuria is a fourth condition of special character. It is observed now that, in marked pyrexia, the appearance of albumen in the urine is as common as the appearance of the same constituent after acute exercise. I have, for my own part, been astounded at finding what a frequent occurrence is albumen in all the febrile diseases during the acute stage. Until recently we have thought that scarlet fever, and that in its latest stages, was the exceptional malady for albuminuria. In some particulars it is exceptional, without doubt, because few, if any other, of the zymotic affections produce and leave such serious effects; but it is in no way exceptional beyond that; and if my observation be correct, there is, in the early stage of scarlet fever, no more evidence of albumen than in any other disease of a similar type in which the temperature stands at the same degree. This pyrexial albuminuria in the early stages may be considered as probably due to similar conditions as those relating to extreme exercise, and as brought about by excessive waste induced by high temperature. But when the albuminuria occurs at a later stage, as specifically in scarlet fever, then consent would seem to be given to the idea that the abnormal state is induced by epithelial changes, by renal obstruction as a consequence, and by true organic modifications in renal function. It remains, therefore, a question whether pyrexial albuminuria should be classified with the specific form of the disease following upon scarlet fever. For the present, however, that is perhaps the best position.

5. Albuminuria from irritation. This class of albuminuria, which will be found so well stated by Edward S. Wood, is very definite and, according to this author, affords, by far, the largest number of cases of albuminuria. The sources of irritation leading to the condition are numerous: a concentrated condition of the urine; the action of chemical or dissolved irritants, including some of the abnormal constituents of urine; the mechanical action of some drugs, such as cantharides; the mechanical action of such irritants as uric acid and urates; and the action of bile.

6. Uric acid and oxaluric albuminuria are terms indicating a

form of albuminuria which had not been described fairly until 1892, but which has now been very forcibly narrated by Da Costa as an albuminuria connected with the uric-acid diathesis or with oxaluria. Da Costa contends, and, as it would appear, most rationally, that this form of the disease constitutes a very distinct type, in which, when uric acid is the disease-producing agent, rigidity of the arteries and increased arterial tension, usually thought to belong to the uric-acid diathesis, is very rarely present, while the hypertrophies and other cardiac lesions are markedly absent.

7. Albuminuria from nervous excitement and from nervous shock, as following upon acute mania, or after injuries or severe surgical operations,—in fact, after any condition affecting the nervous system, which leaves what may be called a sympathetic paralysis,—is another type of albuminuria, evidences of which are found abundantly in the course of practice.

8. Albuminuria from changes in the blood. This, though rather a vague definition, requiring to be much exemplified in the future, may be accepted as distinct in its nature. It is, perhaps, most distinctly typified in the albuminuria which often is present with purpuric states of the blood, and occasionally in anæmia, and in that form of anæmia called pernicious.

9. Lastly, there is the true renal albuminuria, in which degenerative changes in the kidney itself, or contraction, so alter function that albumen is a permanent excretion from the organ.

Albuminuria and Life-Assurance.—The relation of albuminuria to life-insurance—that is to say, as to the value of the lives of persons presenting themselves for insurance—has entered recently into quite a new phase, owing to the enlargement of view respecting the phenomenon of albumen in the urine. Not many years ago, the presence of albumen in the urine—even any trace—was considered very detrimental to the value of persons wishing to be insured. It was considered that, whenever albumen was present in urine, the patient in whom the symptom occurred was fatally stricken, and the value of the life for insurance business was discounted or discarded. In time, it came to be known to the insurance boards that great discrepancy of statement was often made by medical men in relation to the reports on urine derived from the same patient. One observer would detect albu-

minuria in his specimen of urine passed by a patient, another would fail to detect, and the discrepancy caused great confusion and difficulty. At last, it began to be generally admitted that the same patient might pass at one time urine that was albuminous, and at another time urine that was not albuminous. This has given rise to a new department of observation, and has opened the question of the phenomenon of the intermittency of albumen in the urine. In the subsequent part of this report several papers will be found bearing upon this topic, and, among others, a remarkable one, because of its statistical quality, by Hingston Fox, in which no fewer than two hundred and eighty-two cases are carefully analyzed.

The general opinion that has been formed by physicians on this subject seems now to be that they ought to take a much wider view than they have hitherto taken, in regard to the attending circumstances connected with albuminuria, and that they should hold the patient for a long time under close observation before they form a prognosis which shall prevent him or her from being rejected by the insurance board. On the medical side the view is, that great numbers of persons who are in sound health remain uninsured, because the reports of the medical examiners refer merely to occasional and physiological albuminuria. If, it is said, it be true that the mere matter of brisk physical training or exercise, like fencing, may produce a temporary albuminuria, what hitherto unknown risks a man wishing to be insured may undergo from error of diagnosis! This, which is the medical side of the question, is undoubtedly exceedingly important testimony; but it will be a long time, even when these admissions are fully indorsed and confirmed, before the public will reap the benefit of the new lines of research that have been opened. There are, in this matter, two sets of officials concerned,—the scientific, or medical, examiners, and the directors who have the responsible duty of selecting lives recommended to them. The first of these officials (the medical) may prove themselves, and may be proved, to be strictly correct. They may learn to diagnose correctly all the varieties of albuminuria which have been sketched out above, and they may also learn, in a particular case, how far the prognosis may reasonably be extended; but, for all that, it will be a very long time before they get over the term of “albuminous urine.” It is true that

many persons are rejected on that term, and, perhaps, improperly rejected; but, on the other hand, it is equally true that the mortality from albuminuria, amongst persons insured, is alarmingly great. The last is a concrete fact which the records of the insurance office are constantly revealing. The director, therefore, has to take into account a favorable special prognosis, in connection with what is unfavorable, when the whole of the record is appraised. He has to weigh a medical opinion, resting, as he would say, on favorable probabilities, against a dead proof that, in the main, albuminous cases go wrong,—a method which will lead him to reject what seems favorable until the scientific demonstration becomes, by repeated experience and observation, absolutely demonstrable. I speak this in my capacity of a director of many years, while retaining all my admiration for the work which my profession is performing in its efforts to arrive at precise facts in the measurement of life.

Dietetic Treatment of Albuminuria.—On the treatment of albuminuria in its permanent form there is a remarkable unanimity of opinion on the subject of dietary. All seem now to be agreed that, in every case of albuminuria, a pure animal dietary of flesh should, as far as possible, be avoided, and should be replaced by a vegetable and fecaline diet. Thus, so distinguished an observer as Dujardin-Beaumont argues that, under the influence of an exclusive animal diet, the quantity of albumen eliminated in twenty-four hours is nearly doubled, while, under an exclusively vegetable and fecaline diet, the albumen is reduced to a third part of the quantity that is eliminated under a *régime* of mixed animal and vegetable food. This idea of a purely vegetable diet in albuminuria has, in many cases, been accepted as superior to the milk diet, with which we have been for some years past acquainted, and which has answered sometimes remarkably well. As it seems to me, the evidence altogether favors the idea that the purely vegetable *régime* is the best, or, at all events, a *régime* in which the vegetable food plays the chief part and in which milk comes in simply as an accessory. This would accord with my own experience of diet in albuminuria. I have now a medical friend who has subsisted for several years exclusively on milk, with a little fresh vegetable, and now and then a taste of fruit, and who carries on an active professional and business career with all the character-

istics of sound health. I have also a patient, with permanent albuminuria, who subsists exclusively on vegetable diet, chiefly bread, apples, and oatmeal, with the same faculty for active and enjoyable existence.

Anæsthesia and Albuminuria.—Attention has been called to the importance of examining the urine, especially for albumen, before subjecting a patient to a general anæsthetic; and one practitioner, Long, will be found recommending this practice in all cases. The method would create almost a revolution in surgery, and would not, probably, be considered as practicable; but it is a valuable suggestion, and one that should be turned to account in all cases of subjects of middle or advanced age, whose appearance suggests the presence of renal disease. Whether the presence of albumen in the urine should prohibit any surgical operation is a moot point. Snow laid it down as an axiom that, if an operation must be performed, however serious it might be, the administration of an anæsthetic was justifiable, on the whole, and that rule has been pretty generally adopted without any manifest bad results. I have, myself, administered ether, chloroform, and methylene to great numbers of persons suffering from albuminuria, without any untoward result.

Treatment of Cystitis.—On the subject of the treatment of cystitis great difference of opinion prevails, both as regards the general and the local treatment, particularly in the course of the chronic stage of this disease. Two internal remedies claim special attention, viz., salol and infusion of sandal-wood, the latter an old remedy which has been in use largely in England amongst the illiterate, but which had fallen altogether out of favor amongst the members of the profession of physic. It is claimed for salol that, in the worst class of cases of chronic cystitis, the remedy, acting antiseptically, possesses all but specific action for good when it is given in full doses and persisted in; furthermore, that it passes through the stomach without being decomposed and without interfering with the process of digestion—its decomposition commences in the duodenum—and that the effect of its administration on the urine contained in the bladder is to restore the normal condition, and so effect a cure in what may be called a direct manner. This is the view on one side; but there are some who assert that the salol is altogether inert, and that the cure in

cases where it has been administered is due to some other and overlooked cause, perhaps a natural cure. I may say, in regard to this point, that in one typical case of chronic cystitis in hospital, the patient being a man, 24 years of age, who had recently suffered from typhoid fever, the administration of salol in full doses was followed quickly by the most satisfactory effects. The urine, which had previously been alkaline and offensive, and which yielded a free amount of purulent deposit, changed into a natural condition, with cessation of pus, within ten days, under 15-grain (0.97 gramme) doses administered three times a day. The pain and frequent micturition were very speedily abated, and, as far as my unprejudiced observation could go, these good effects were due directly to the remedy. The bacteriologists attribute the action of salol to its influence in destroying or preventing the development of the bacilli, on the presence of which they believe the symptoms to depend.

The argument in favor of sandal-wood-oil is that it is of most value in cases of blennorrhagic cystitis. It is said not to produce the intestinal disorders observed as arising under the influence of allied balsamic remedies; that it does not affect the digestion, but rather stimulates it; and that, when hæmaturia attends cystitis or polyuria, the effect is favorable.

In the local treatment of chronic cystitis three remedies have, during the last year, been specially employed. These are: solution of salicylic acid, solution of bichloride of mercury, and solution of nitrate of silver. The reports on the action of salicylic acid are in every way encouraging, and those which relate to the injection of solutions of nitrate of silver are favorable. The warmest discussion has taken place on the use of mercury-bichloride solution. Guyon has been warm in his advocacy of this remedy, employing it in the form of a 1-5000 solution. It has been used in the form of instillation and in the form of injection, the claim made for it by its supporters being the directness of its action, one application being sometimes sufficient to effect a cure. It is admitted to be a painful remedy, and those who oppose it speak of it as being attended with many dangers. On the whole, the weight of evidence appears, at this stage, in favor of a milder line of procedure; and one author (Ricketts) will be found advocating, on good grounds, the internal use of tincture of belladonna in very large doses, with no

other local measure than simply washing out the bladder with water.

There is one matter of great practical importance that requires to be remembered, in the treatment of chronic cystitis in cases where there is no foreign body in the bladder, namely, the frequent tendency there is for what may be called spontaneous cure when the patient is kept for some weeks in bed, as in hospitals, and is sustained on a perfectly simple and, if the term be allowable, soothing diet; that is to say, a diet free from all alcoholic and other stimulants, with reduced quantity of animal food, and with a free portion—60 fluidounces (1800 grammes) a day—of pure water softened from lime down to 7 or 8 degrees, or of distilled water, which is still better.

Supra-renal Capsules.—I regret that there is no specially great advancement of knowledge in regard to the supra-renal capsules, or of that peculiar disease, Addison's, which is supposed to depend upon a pathological condition of these capsules. The most that can be said is that, in all the examples quoted in which the symptoms described by Addison were presented, disease of the supra-renal capsules was usually found in accordance with his original description. The idea that the involvement of the splanchnic nerves, in the supra-renal disease, might have something to do with the symptoms of the disease itself, seems to have been entirely set aside by the observations of H. M. Buchanan, who, although he had seen a case in which there was such involvement, found, in another case, no repetition of the same state. Altogether, we are left, in 1892, in much the condition of knowledge which has hitherto prevailed in regard to supra-renal physiology and pathology. There are, however, two points upon which some light has been shed: 1. It has been shown that the removal of *one* supra-renal capsule does not, as a rule, lead to death. There may follow, in this operation in lower animals, an occasional death, and in all there may be in the first days some indications of emaciation, from which recovery takes place. But when both capsules are removed, death always follows rapidly; and this, even when some days elapse before the second capsule is destroyed after the destruction of the first one. 2. It has been suggested that the bronzed skin and other symptoms of Addison's disease may be due to local mischief to the supra-renal ganglions, the splanchnics, or the semilunar

ganglion, a suggestion sustained by the observation that the symptoms are, or may be, developed only when the external surfaces of the capsules are affected. There is here a note for remembrance.

Quinine and Lysæmia, or Malarial Hæmaturia.—The new word, to most readers, of “Lysæmia,” signifying malarial hæmaturia, refers to a disease which has recently been much studied in the Southern States of America, and which has given rise to more than one very remarkable controversy. The symptoms of hæmaturia appear in the course of malarial disease, or malarial fever, and add greatly to the embarrassment of the practitioner. For the treatment of malarial fever, simply quinine, or some other form of cinchona, has been considered, until late times, as the specific for cure; and practitioners have become accustomed to administer the remedy in very large doses. Patients who have left warm climates, where malarial disease exists, and have come to England, and other places in the Temperate Zone, have been accustomed to bring quinine with them, and have learned of themselves to take it in doses varying from 15 grains (0.96 gramme) to 1 scruple (1.30 grammes), whenever the malarial seizure came on. We have formed an idea from this that the full dose of quinine was the best possible practice, and I do not remember ever hearing the point disputed; but now, amongst the practitioners who are fully engaged in the malarial districts, where malarial disease is very frequent, a change of opinion has taken place and is held by a very large number of observers. It does not seem to be denied that quinine may have an effect for good in the treatment of malarial fever, under some circumstances, but it is believed by many that, when the course of the disease is marked by hæmaturia, the cause of that symptom, which forms so serious a contemplation, is nothing more or less than quinine used as the cure. The theory seems to be that, when quinine is taken in large quantities, at repeated periods, there is produced, after a time, a paresis of the sympathetic system, and, thereupon, congestion of the kidney, attended with the loss of blood and with after-mischiefs of an organic character. Those who maintain this view conclude, therefore, that the best treatment for malarial fever is treatment by evacuation. They give purgatives—some mercurial, others saline purgatives—freely; and a few, who are specially conversant with the disease, add to the purgative treatment the administration of

turpentine. The result of this change of treatment is pronounced by its advocates, to be of the most startling character in the way of success. One says that under the old quinine treatment he lost nearly the whole of his cases, while under the new treatment the loss of a case is quite exceptional, although, on both sides, it is admitted that the disease is fatal under every known variety of treatment that has been followed strictly. Connected with this new school of thought there is another, which may be called electric in its form. The exponents of this school say that, in their opinion, quinine possesses special virtues, and ought not to be, on any account, given up in treatment; but they add that the danger of quinine (for they admit a danger) lies in administering it without having recourse, at the same time, to free elimination from the bowels and from the kidney. These, therefore, combine the two systems. They adopt an eliminative or purgative plan before they commence with the quinine; then they give the quinine in larger or smaller doses,—some in large and some in small doses,—and, at regular intervals, they repeat the eliminative process. They argue that, under these circumstances, the quinine does not produce congestion by any action on the nervous system, while its presence is very beneficial for destroying the malarial causes that are at work in the production of the malarial fever, which, as a general rule, men of all schools, rightly or wrongly, attribute to introduction into the body of the specific malarial germ. A third school still exists, in which the practice of administering quinine in large doses, as heretofore, prevails.

After carefully reading all the evidence for and against this hypothesis, about the action of quinine in producing hæmaturia, it seems clear that those who have traced out danger from quinine have the balance of evidence largely in their favor. They speak, perhaps, with too much determination and decision in some of their observations, but, taking all they say into consideration, they give very sound proof of correctness of view. In so far as I know, or can discover from reading, no such symptom as hæmaturia has been produced by quinine away from the malarial districts where malarial fever prevails and quinine has been the sovereign remedy. At the same time, it has been discovered that quinine, given in moderately large doses, passes away by the kidney in considerable quantities, without undergoing any material change,—a fact which led one

of our hospital physicians, in a country town in England, to recover, from the urine of patients taking quinine, a large quantity, which otherwise would have been lost. I was at one time, myself, accustomed to give quinine in large doses during recovery from febrile states and in remittent attacks. I found then that when the remedy was long continued, not only were there symptoms of that relaxed arterial tension which goes by the name of "cinchonism," but, not unfrequently, a suppression of urine with lumbar pain that might be referable to the kidney. These observations lend countenance to the theory of quinine as a cause of hæmaturia; and, without suggesting to me any such thought, they led me, of themselves, to cease the administration of quinine in the heroic dose. I have, for years past, therefore, rarely exceeded a grain (0.65 gramme) dose for an adult, and with a result certainly as satisfactory as when the larger doses were employed. In malarial districts the conflict about quinine is still in progress, and, during the present year, we may fully expect that the difficulties will all be cleared up, and that we shall arrive at the exact truth. It will be a singular episode in the history of therapeutics, if it should turn out, as may be expected, that the application of a valuable remedy for one particular disease has, by matter of a mistaken mode of administration, set up another series of symptoms which, of themselves, stand out almost as a distinct and very troublesome form of disease.

Another point of practice under dispute, in regard to the management of malarial hæmaturia, is the propriety of attempting to arrest hæmaturia by septic or narcotic remedies. Those practitioners who hold the view of the quinine origin of the symptom maintain that it is bad practice to attempt anything like arrest of the escape of blood. They consider that the hæmorrhage is a source of relief, and that, the quinine being withdrawn, the effects cease without any further interference. To their minds, therefore, the administration of a narcotic or of an astringent of any kind is prejudicial. The whole subject opens up a novel and interesting inquiry relating to the physiological action of quinine. If quinine, like amyl nitrite and nitro-glycerin, has the effect, when taken in full doses, of paralyzing or weakening the sympathetic control of the minute circulation, a new feature relating to its therapeutic action has been added, and must be studied in future, in a prescription containing

quinine for all classes of cases, and especially in that prescription in which quinine is combined with other medicinal agents.

A third point, not only curious, but practical, relates to racial differences in regard to malarial hæmaturia. Amongst the physicians who are engaged in practice in communities where there are representatives of the white and of the negro race, the difference of opinion is exceedingly strong. One says that he has never known a representative of the negro race to suffer from the hæmaturia. Others say that they have known the phenomenon. But I think it may be fairly accepted that, admitting the possibility of the hæmaturia amongst the negro population, it is comparatively rare as an event; those even who have seen the phenomenon being inclined to admit that they looked upon it as peculiar. Why this should be the case is not at the present moment distinctively clear. Whether it is that quinine has a different action on persons of different race, or whether malarial disease operates differently in persons of a different race, we have yet to learn; and the inquiry opens up many points which are really historical in their character, as well as medical. The subject involves the whole question of the action of light on living organisms, and on the effects of light in the production of pigmentation. There must be most definite changes in the physiological condition of bodies in which there is a cutaneous surface charged with pigment as compared with those in which there is no layer of pigmentary material. The influences of season and of heat must have come into play, and change, in a telling form, the cutaneous transformation, and still more determinately the cutaneous resistance, both of which, and each of which, changes must necessarily modify the renal function, and the action of all remedies that produce variation of function by their influence on the organic nervous system, and, through it, the minute circulation.

Granular Kidney and Cardiac Disease.—With granular kidney and albuminous urine there is usually existent hypertrophy of the heart, and, as a rule, it is assumed that the cardiac lesion is dependent upon the renal. There is a disposition now to accept this ruling as absolute, and it is assumed that, in some instances, the disease of the kidney may be secondary, or that the two may be coincident and consequent on some other condition upon which they both depend. One observer also records the facts of a

nephritis and granular kidney which occurred after pneumonia, and thinks that the observation is original, and it probably is original as a published statement. It calls for careful consideration, since it opens a new view respecting the interrelationship of renal and cardiac manifestations of disease and the therapeutical outcome.

Treatment of Uræmic Coma.—A return to the practice of venesection has been observed, during the past twelve months, in many cases of disease, and in none more than in the treatment of uræmic coma. When the patient, the subject of uræmia, lies in the comatose state, with or without paralysis, with the temperature equal at least to the natural and with the veins well filling, it appears rational that a free portion of blood should be withdrawn from a vein, in order not only to relieve the kidney of its affection, but also to relieve the right side of the heart, which, in some cases, is usually working with considerable difficulty, owing to the pressure of the blood within it. The reports of 1892 indicate that venesection for uræmia is becoming—we cannot say a revived, but we may say—a frequent practice, and it certainly will be likely to continue in favor the more it is resorted to under properly-selected opportunities. I have myself abstracted blood eighteen times in different persons suffering from uræmic coma, and, in the latter part of last year, two patients in hospital under my care were bled on the same day. The one was a young woman, in profound coma with convulsions, who had, for some weeks past, shown definite indications of albuminuria,—probably of a temporary kind, because the albumen has now ceased to be presented in the urine. She was bled freely while comatose, gaining some consciousness as a direct effect, and making a rapid and good recovery. The other was a man of middle age, who had been long suffering from albuminuria in that form which may be called toxic. He was affected with œdema and had also a partial paralysis of both sides of the body. He fell rather suddenly into the comatose state from uræmia, and was entirely unconscious. Venesection, in his case, was employed as the only means that could rationally be considered of service, but, owing to the slowness of circulation, it was with difficulty that even a moderate amount of blood (12 ounces—360 grammes) could be extracted, although a vein was opened in each arm. In his case, nevertheless, though he ultimately sank, signs of relief were, for a time, presented. In

another case of a similar character, I would, if the circumstances permitted, abstract blood while the patient was in the Roman bath at 140° F. (60° C.). In that temperature the flow of blood would be more copious and the transudation from the cutaneous surface would give additional relief to the kidney.

Treatment of the Uric-Acid Diathesis.—An advance has been made in our knowledge of the treatment of what is termed the uric-acid diathesis. This knowledge may appear to some as wanting in novelty, and, in a certain sense, that is true; but it is novel in another sense; it is novel in that it supplies a physiological basis for a practical procedure. The great fact gained is that all acid urines, as will be seen by referring to the section in which Roberts's labors are epitomized—all acid urines, to use his own words, invariably deposit uric acid sooner or later. In perfect health the acid held in solution, by its combination with alkaline bases, does not deposit its uric acid, not even after it has been voided, unless it stands for a considerable time. But there are conditions of body, which can scarcely be called unhealthy, in which the tendency exists to such deposit within the body in the urinary system. The constitutional state to which the name of gout is given is the principal disposing state, but we must not any longer look upon this as exclusive. In plain words, the combination between the acid and its bases may be broken without the hereditary formula under which gouty subjects are classified. Whether this breach of function, once established, may become hereditary, is a point not as yet cleared up, for indeed we have to learn what are the elementary conditions upon which the primary derangements depend.

At the same time, the knowledge we have had at our command is most important in regard to dietetical and therapeutical considerations. One fact alone, bearing on this subject, is rich in value, namely, that a free quantity of saline matter in urine is protective against deposit, whilst poverty in saline constituents is a definite disposing cause of deposit. Thus, the same mode of life that has been provocative of calculus amongst the natives of India, who are fed on inadequate vegetable foods, has been witnessed in England and in other parts of Europe, side by side with the opposite fact, that the people who live on better foods are more exempt, unless they run into riot in the contrary direction

and disturb the natural balance by luxurious feasting. Therapeutically, there is elicited by these new researches the exposition that, under an alkaline treatment, the tendency to deposition of uric acid is controlled, and, conversely, that every measure which increases the acidity of the secretion has the effect of favoring deposit. A wide field for observation is opened here for every practitioner of medicine, the problem being how to prescribe a simple and sociable mode of diet combined, perhaps, with some unobjectionable medicaments that shall prevent the natural acidity of the urine from being so far exceeded that the deposition of uric acid, neither in the kidney nor in the bladder, shall be permitted.

DISEASES OF THE KIDNEYS.

ALBUMINURIA AND BRIGHT'S DISEASE.

Albuminuria in Relation to Surgical Operations.—The question whether the presence of albuminuria in any way interferes with the results of surgical operations is one that has been under discussion ever since the time of Richard Bright, to whom we are so much indebted for original research on conditions of the kidney in which albumen is present. The feeling in England has always been, that the presence of albumen in the urine means additional risk in case of every important operation. This question I. W. Long, of Randlemann, N. C.,⁴³ discusses at length. He commences by stating that albuminuria means an expression, on the part of the kidneys, that something is wrong; that the great excretory organs are more or less damaged, and not doing their whole duty. He is aware that this free translation is open to criticism, and that the mere presence or absence of albumen in the urine is not always a crucial test by which to estimate the conditions of the kidneys; but, taken in connection with the physical properties of the urine, it is a symptom of far-reaching significance. With the process of testing for albumen, he takes in, also, the amount of urea secreted, and whether or not casts are present. He then discusses his subjects under the following heads: 1. Does an operation ever induce albuminuria in healthy kidneys (a) through the influence of the anæsthetic employed? (b) by the operation *per se*? 2. Does albuminuria increase the dangers of (a) the anæsthesia (b) by the operation *per se*? 3.

Does an operation ever relieve albuminuria by overcoming the conditions for which the operation was performed?

The author considers these important questions by the quotation of the views of other authorities, as well as by the expression of his own. He carefully weighs the evidence in respect to anæsthesia, in cases of albuminuria, and concludes that neither ether nor chloroform are injurious to healthy kidneys,—or, if so, on the rarest occasions; that when renal disturbances from the use of an anæsthetic occur, they are rather due to prolonged narcotism,—“exposure of the patient,”—or the combined influence of the operation and the anæsthetic; that a mild degree of albuminuria, or nephritis, is not a contra-indication to the use of chloroform or ether; that, in the presence of redoubled and extensive renal changes, an anæsthetic may be employed, provided the patient or family are advised of the additional risk; that it is a moot question whether chloroform or ether is least dangerous in albuminuria,—unless it be in obstetrical operations; that, by reflex sympathetic action, profound functional disturbance and organic renal lesions may be induced by an operation, apart from the influence of the anæsthetic; that operations on the abdominal or genito-urinary organs, or about the mouth and rectum, are specially liable to produce renal complications; that a healthy condition of the kidneys minimizes, but does not obviate, danger; that albuminuria is always indicative of renal lesions, and should be regarded with distrust, but is not a positive contra-indication to an operation, except it be associated with other evidence of advanced renal changes; that no operation should be undertaken without first candidly stating to the patient or friends the dangers incident to the condition of the kidneys; that, paradoxical as it may seem, an operation will sometimes relieve an albuminuria due to acute affections; and, finally, that no surgeon is justified in undertaking an operation without first knowing the state of his patient's renal organs.

According to the report of Drzewiecki, of Warsaw, corresponding editor, Misiewicz states ⁵⁰⁹_{nos. 9, 10, 11} that physiological albuminuria often occurs in persons in good health, lasting only a short time, and must be considered as a transient phenomenon, because of the absence of morphotomic particles, and because the quantity of albumen itself does not exceed 0.4 per cent. Misiewicz

believes that albuminuria appearing in children during sexual development (albuminuria cyclica) is the stadium decrementi of the abortive form of inflammation of the kidneys, as is also albuminuria reflectoria. Pathological albuminuria was observed by him during contagious diseases, in anæmia perniciosa, general marasmus, etc., and also as a consequence of physical and chemical stimuli. Besides ordinary albuminuria, there must be distinguished: albuminuria purulenta, peptonuria, propeptonuria, and hyalinuria, as well as albuminuria due to obstruction of the urinal canal and albuminuria gravidarum, to which Blanc ascribed a parasitic origin. Albuminuria occasioned by Bright's disease arises from pathological changes in the glomeruli (glomerulo-nephritis), and only later do the parenchyma and conjunctival tissue take a lesser or greater part in the morbid process. Albuminuria in contagious diseases principally consists of sphaelus of the epithelium, in consequence of disturbances in circulation and nutrition, or of emboli caused by casts (emboli glomeruli). Albuminuria from venous stasis is occasioned by atrophy and fatty degeneration of the epithelium, for want of oxygen and chromatin. Albuminuria from exhausting processes occurs from disturbances in the regeneration of the red corpuscles of the blood, as well as from embolic glomeruli from degenerated blood-corpuscles.

Relation of Albuminuria to the Psychoses.—Raymond ¹⁹ says that the albuminuria present in mental disease is either dependent upon the affection of the nervous centres, or is due to disturbance in the renal function, in which case it may become the direct cause of mental ailment; sometimes a relapse of the latter may go hand-in-hand with a return or increase of the albuminuria. In alcoholism, the amount of albumen in the urine varies with the intensity of the delirium, and it often occurs in the delirium of alcoholism, when, in case of the death of the patient, no affection of the kidney can be found. In other forms of mental disease, albuminuria is met with principally in the acute stage; frequently a certain relationship between the degree of the delirium and that of the albuminuria is noticeable. Upon administration of digitalis the œdema disappears, the albumen in the urine is increased, and the delirium passes away. The albuminuria, therefore, brings about a poisoning of the system, which, under certain circumstances, gives rise to the development of, or causes an increase in,

the psychical disturbance. In the course of chronic nephritis, delirium, simulating insanity, may occur with the uræmic intoxication. The cases reported by the author illustrate this. The maniacal excitement, combined with religious and erotic delusions and hallucinations, occurred in individuals having no hereditary disposition, during attacks of uræmia of chronic nephritis. Dieulafoy calls this disease "*folie brightique*." The treatment of these cases does not consist of the application of the cold douche, nourishment, etc., but must be directed toward the affection of the kidney and exclusive milk diet.

Ch. Finot³_{pub. 17} reports that the urines of healthy subjects have been found to contain albumen in the proportion of 5.5 when the examination was carried out in the morning, and in the proportion of 11.6 when the examination was conducted after midday. After horse-exercise, the proportion reached the figure of 17; and after fencing, that of 41.2 per cent. He concludes, from these facts and comparisons of figures, that muscular work and digestion favor the production of albuminuria, and these researches confirm those which Capitan has made on the same question. Féré, in speaking of these results, reported that two imbeciles under his observation, after an excess of anger, provoked or spontaneous, presented albumen transitorily in the urine they passed.

In a further communication to the Society,³_{pub. 23} Capitan stated that he had found albumen, generally in small quantity, in the urine of subjects who might be considered as in good health. He had examined, from this point of view, the urine of two hundred and fifty subjects. His pupil, also, Châteaubourg, continuing the researches in the same direction, confirmed his conclusions, after having examined a great number of subjects in the morning, after rising from bed. He demonstrated the influence of fatigue, of hard work, of meals, and, above all, of cutaneous and nervous excitement, upon the production or increase of albumen in normal subjects. He was able, further, to discover a quantity, sometimes marked, in the urine of healthy persons,—for example, soldiers. Finally, he examined all the fluid micturated by two healthy subjects, a man and a woman, observing all the circumstances that were able to bear upon the appearance and the quantity of the albumen. He had made, in brief, more than seven hundred examinations of urine.

On the question of percentage of healthy persons passing albumen, the figures of Châteaubourg were much higher than those of Finot; but, taking altogether the researches of the three observers,—Finot, Capitan, and Châteaubourg,—they agree generally, and, in point of difference, show difference in degree only. Presuming that there are no errors in the mode of testing for the albumen, the inference to be drawn from the inquiries would be that the excretion of albumen by the urine ought, under certain circumstances, which can scarcely be considered abnormal,—namely, after active exercise, like riding and fencing; after mental activity; and after meals,—to be considered a normal process in the majority of people.

Albuminuria, Temporary or Permanent, Functional or Organic.—B. Symonds¹⁰³¹ deals with the above-named subject. He objects strongly to the term “physiological albuminuria” which has, unfortunately, crept into common use, and insists that the term signifies as impossible a thing as a physiological irregularity of the pulse. It would be much better to speak of such cases as functional. There are, the author considers, many sub-varieties of functional albuminuria, among them the dietetic, the muscular, the cyclic, and the simple persistent. There are two etiological factors not usually mentioned. One of these is adolescence; the other is the recent epidemic of influenza which has ravaged the country. The effect of the latter was very marked, during its entire prevalence. These facts have been personally noted during the last three years, in examinations for the Mutual Life-Insurance Company. Besides the mere existence of a transient albuminuria, he desired to know whether the functional change had any bearing on the chances of the individual for living. For this purpose, about two years ago he began an investigation in which the following facts were elicited: Over three thousand declined applications were examined, several hundred letters written, and a number of personal interviews were held, but the results were small. Of the cases in which some definite information was obtained, thirty are living and fourteen are dead. In the report, they are arranged according to their ages at the time of examination. The following conclusions can be drawn: In some cases the existence of albuminuria was temporary and transient and had no influence on the prognosis. Of thirty who are still living, many have since been

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accepted by other companies. Many, also, report that they are in good health now,—at intervals of eleven to sixteen years since the original examination.

Intermittent Albuminuria.—Lécorché and Talamon⁸¹ record a case of intermittent albuminuria in a girl 18 years of age, of delicate complexion, who, in March, 1891, suffered influenza in an intense degree, but without any apparent complication. The convalescence was lingering and the patient was left with a persistent feebleness, which was not explainable until, in the month of July, the urine was examined and was found to be strongly albuminous. Under treatment, the urine became all but free of albumen at the end of September, but, on the commencement of October, following upon a herpetic, febrile attack, it re-appeared during several days; then it fell and became intermittent in its appearance. The presence of the albumen still continues at times, and when it is present the symptoms of lassitude re-appear. The authors conclude, in reference to this case, that it is not of the kind that would come under the title of "*cycle physiologique*," but springs from the same centres and presents the same variations as ordinary cases of Bright's disease; there is no reason to consider it as functional or independent of any retinal alterations. It ought to be attributed, as in all albuminurias, to a glomerulo-nephritis, very superficial or very localized.

R. Hingston Fox,⁶ Dec. 13, '91 treating on the same subject, bases certain conclusions on records of two hundred and eighty-two cases examined by him, for several insurance companies, during the last seven years, exclusive of all in which no detailed notes of the condition of the urine were kept, and of all re-examinations of the same persons. Two only of the cases were women; the urine of other female cases was not obtained. The ages varied between 14 and 65; average, 32.8 years. Most of the men were engaged in commercial or professional life, in or near London; about half the number as principals or employers; others as clerks, agents, travelers, or shop-keepers; there was a sprinkling from most classes of society, from members of Parliament to tradesmen. All professed to be in good health. Amongst the two hundred and eighty-two, albumen was present in the urine of 86, or 30 per cent. John Munn, of the United States Life-Insurance Company, found albumen in 11 per cent. of applicants. Grainger Stuart's statistics of

one-third albuminuric in five hundred and five healthy persons are well known, and Cranstoun Charles has made like observations. But such records are not truly comparable, since they depend entirely upon the methods of the several observers, and no one has yet decided what constitutes a trace of albumen short of which a faint opacity may be disregarded. Of the 86 cases, 21 showed a small trace, 37 a trace, 19 a marked cloud, and 6 a dense cloud of albumen, whilst in 3 it could be readily measured.

The author has sought to classify the cases in which albumen was found as follows:—

1. *Albuminuria of Renal Disease.*—Eight cases. In these the albumen was sometimes in large amount,—enough to measure,—and was associated with other signs of kidney disorder.

2. *Permanent Albuminuria.*—This was exhibited, in one case, in a professional man who had an excellent record in all other respects. He was uninsurable, and, two years later on, his health meantime being excellent, he presented, on examination, the same condition. This and another case of similar kind leads the author to conclude that albumen may, in rare cases, be discharged in considerable quantity, by the kidneys, during a course of years, without the ordinary signs of nephritis. A local seat in the kidney, resulting from damage long ago, might explain such a case.

3. *Albuminuria of Loaded Urine.*—Twenty-two cases. In some of the cases the urine contained crystals of uric acid or oxalate of lime at the time of passing. Abundant uric-acid crystals appeared, in other instances, to play a like part. In other cases the urine was simply concentrated (specific gravity, 1020 up to near 1040), overacid, and pigmented, and generally depositing oxalates or uric-acid crystals later on. In such urines it is usual to find a trace of albumen, sometimes more than a trace, and, in several instances, the albumen disappeared when the urine became more dilute. Such concentrated urine is very common in confined city life, perhaps more especially in persons with gouty family histories, but mainly where muscular and lung exercise do not bear their relation to the ingestion of food. The albumen may be due to irritation of the kidney structures by the acid matters; sometimes, perhaps mechanically, by the crystals. In the author's experience, albumen is commonly found in glycosuric urines, attributable to irritation of the kidney by the sugar.

4. *Albuminuria of Unstable Circulation.*—Twenty cases. A large, important class. A trace or thin cloud of albumen was present, without, necessarily, concentration of urine, but coincident with circulatory disturbance. In such subjects there is an excitable heart, the apex-beat generally low, the impulse exaggerated under examination, the action rapid, and often a hæmic, systolic bruit heard at the left edge of the sternum or at the apex itself. In two or three cases partial syncope came on during examination. The trace of albumen which usually attends this condition does not notably increase the risk in such lives, which must be estimated with due regard to the circulatory instability. These cases belong to the category of "functional," cyclic, or postural albuminuria, characterized by the passing of albumen in the first half of the working-day, declining toward night.

5. *Toxic Albuminuria.*—Eight cases. Here the cause has reference to articles of food, drugs, or poisons. Several cases suggested the direct action of alcohol as a cause. Some of these may properly be referred to the heading of "hepatic albuminuria."

6. *Albuminuria of Strain or Shock.*—Three cases. Severe muscular exercise; head-work, as at examinations; or the shock of cold to the surface in bathing, are here the factors at work. Illustration of the first: a father and two sons were examined in the country for life-assurance. The family was a healthy one, given to out-door exercise, and all playing cricket. It was a warm summer's afternoon, and they came in perspiring freely. A specimen of the urine of each was almost, but not quite, identical; the urine was concentrated (specific gravity, 1025-1026), depositing copious urates, and albuminous to distinct cloudiness.

7. *Vesical, Urethral, and Vaginal Albuminuria.*—Five cases, probably more. Here the albumen is due to slight catarrh of the bladder, or of the urethra, as in gleet; or, in women, to leucorrhœa. Traces of albumen from these causes are common, and are apt to vitiate our tests in insurance cases, unless carefully excluded. As regards classes of accidental albuminuria, when the source of the albumen has been determined, there is, in the majority of cases, nothing to hinder the recommendation of the life. When a small trace of albumen is unexplained, and all other elements in a life are perfectly sound, it need be no obstacle; but it would have weight, if other points were doubtful.

An editorial writer,¹ devotes considerable space to the consideration of Fox's paper, and the remarks made upon it by Pavy, Sir William Roberts, and Clement Lucas. A. Pavy, who has been officially employed with insurance questions for many years, is a firm believer in the existence of a functional albuminuria which does not lead up to structural disease. Many cases of cyclic albuminuria were dependent on the position of the body, and were not improperly styled "postural," the early morning excretion being usually free from albumen, which appears in the middle of the day, and is gone again at bed-time. An alteration in the mode of life will affect the amount of excreted albumen. Pavy is in the habit of requiring four specimens of urine,—one passed at the rising hour, one at noon, one at six P.M., and the fourth at bed-time. If the patients are in bed during the day, the character of the urine is changed; persons known by their mobile disposition, quick pulse, and irritable heart, with a sharp "smacking impulse," the albuminuric condition may continue long, and then gradually wear away. These applicants are not to be accepted or rejected for insurance, on the results of a first examination; they require investigation. Pavy instanced the case of a young collegian, who studied his own condition to some profit. When a youth, aged 18, he was a good athlete, and passed a civil-service examination; but subsequently, albumen having been found in his urine, it caused his rejection. The case was cyclic, and he was afterward passed. He then went to Oxford, and from there went up for a final physical examination before going out to India. During this time he read up the literature of these cyclic cases, and, when the examination was about to take place, he remained in bed until just before the time, with the result that he was accepted, as there was then a temporary cessation of the albuminuria. Regarding the albuminuria that is associated with glycosuria, Pavy thinks the prognosis usually favorable, if the glycosuria is amenable to treatment; it does not lead on to Bright's disease, as has been taught by some of our recognized authorities.

Sir William Roberts defends the use of the term "physiological albuminuria." The time has gone by when the presence of albumen in the urine should be regarded as equivalent to a death-warrant. This condition might follow shock or strain, the passage of gravel, or the ingestion of a heavy meal. A child might run a

race and come back flushed and with a thumping heart,—symptoms that come within a physiological range; so, too, sharp exercise would cause a temporary albuminuria, which is not, in his opinion, outside of the physiological range. The same was true after the application of cold baths. In regard to the risks of these physiological groups of cases, and others that were only occasional and transient, there is no longer any occasion to pronounce a sinister prognosis, but the diagnosis must be definitely made out for the protection of the assurance companies. If the applicant was in early life, the prognosis is, of course, more favorable than in persons who have passed their fourth decade. Clement Lucas referred to a case where there seemed to be a family predisposition to show albumen in the urine on slight provocation. These belonged to a non-hazardous class of insurers if properly treated. Sewill has described a patient, living to-day in his 77th year, who, twenty-six years ago, had been shown to be markedly albuminuric by the late Sibson, of St. Mary's Hospital. The albumen was present in large quantity, and the causation of the attack was thought to be an undue indulgence in sea-bathing in chilly weather. The case was regarded as serious, and a careful regimen was prescribed. The patient, however, was scornful of medical opinion and did not follow directions implicitly. He had a good family history, and had always been healthy, fleshy, indolent, and a large flesh-eater, besides taking alcohol in moderate amount. In the course of four or five temporary illnesses in twenty years, albuminuria had been several times found, but the general health had not been seriously threatened until three years before, when an ascites and an abdominal abscess made their appearance. It was thought impossible that the man could recover, but he did. He is now hearty and scoffs at regimen and the wisdom of the faculty. Nearly all the physicians, at various times, gave an unfavorable prognosis. Assuming that this man was a rejected applicant for insurance, we can readily understand that an injury was done both to him and to the insuring corporation.

Commenting on all the points raised in the foregoing notes, an editorial ²⁵⁷_{Nov., '91} observes that in placing an albuminuria in its proper place as regards etiology, and in coming to a conclusion as to its probable effect upon the patient's future, the physician must take a wide survey of all the attending circumstances, and

keep the patient for some time under close observation, lest a serious error be made as to prognosis and treatment. There can be no doubt that hundreds of quite healthy persons are annually rejected by insurance companies because of transient and functional albuminuria, thereby entailing much worry and loss, not only upon the unsuccessful applicants, but also upon their families and friends. F. R. Sturgis, ¹_{Mar. 20, 1861} referring to the literature of the subject in hand, draws the conclusion that albumen in the urine does not necessarily signify any renal disease; that it exists, temporarily, in many diseases unassociated with any organic renal complication; that, from the uncertainty of tests and methods of testing, it loses a great deal of its value as a diagnostic sign; and that, if present, in even a small quantity, it is a danger-signal, and, if persistent, indicates some serious organic lesion. The same subject was discussed at a meeting of the Detroit Medical Literary Association, after a paper by Munro. ²⁸⁴_{Jan. 2}

T. A. McGraw thought the companies might safely take some of the cases of transient albuminuria on a short-term policy, with a higher-rate premium. Some form of limited endowment policy might safely be issued to such risks, but it is not fair to expect them to issue long-term policies or straight life-insurance on such lines. C. W. Hitchcock considered that cases showing albumen in the urine must be regarded with suspicion, and even if there be but a small percentage of albumen, the urine should be examined and re-examined, until a specimen free from albumen be found. The same may be said of sugar. G. W. Stoner did not think it any fairer to accept a man after repeated examination in which albumen is found until one clear specimen is shown, than it would be to keep an applicant who presents himself with a clear specimen waiting until a specimen containing albumen could be found, and then reject him; and S. G. Miner, in closing the discussion, said: "The insurance companies pay us well for medical examinations, and we should endeavor, by more uniform, careful work, to return them an equivalent, and remove the odium which clings to our profession from careless examinations."

Albuminuria Not Due to Organic Disease.—Edward S. Wood discusses the question, ⁹⁹_{May 2} from experience gathered during twenty years of examination of urines, in cases of transient albuminuria of renal origin. He considers that, chemically, all cases of renal

albuminuria not due to organic disease of the kidneys may be arranged in one of the three following classes:—

I. Those due to some general disease or disturbance (not renal) which causes some change in the renal circulation.

II. Those due to irritation of the kidneys, which irritation may be general, as in the case of the chemical (or dissolved) irritants, or circumscribed, as in the case of some mechanical irritants, such as concretions in the substance of the kidneys.

III. Those due to some change in the composition of the blood.

The duration of the albuminuria naturally varies with the cause. It may be permanent, as when due to organic disease of some other organ; in which case the kidneys themselves may, after a long time, become affected with some form of organic disease, or it may be temporary, lasting for a longer or shorter time, according to the cause. In the first class, due to some interference with the renal circulation, may be included the febrile albuminuria, which is invariably seen in acute diseases attended with high temperature. In these cases the quantity of albumen is usually only the very slightest trace, which, with the accompanying casts, entirely disappears as soon as, or very shortly after, convalescence begins. In rare cases, in ordinary acute diseases, the quantity of albumen may become quite large and the renal casts very numerous; so that from a single examination it may be impossible to say whether acute nephritis has been superadded to their febrile affections or not.

In the second class are included disturbances of the renal circulation due to nervous diseases, such as delirium tremens, acute mania, and the like. Albuminuria is so common in these cases that no illustrations are necessary.

In the third class are included passive hyperæmia of the kidneys, due to certain organic diseases of the heart and liver, to the pressure of abdominal tumors, etc.

In the fourth, almost any serious disease, wherever located, tends to produce secondary effects upon the kidneys, which result in albuminuria and the presence of casts in the sediment. The effects may be due to a simple disturbance of the circulation from pressure, as in the case of some tumors, or through the action of the nervous system; or they may be due to the diminished or modi-

fied metabolism, resulting in an increased formation of calcic oxalate or uric acid, which will locally irritate the kidneys when separated from the urine within the renal tubules. In all of these cases of renal albuminuria secondary to serious disease elsewhere, the quantitative analysis of the urine will show the diminution of the metabolism, which, other things being equal, will be in proportion to the gravity of the principal affection. In these cases the urine, as a whole (the mixed twenty-four hours' urine), does not resemble that of any of the organic diseases of the kidney, although it is, in some cases, very difficult and sometimes impossible to diagnosticate them from an organic renal disease, if we only have a single specimen to examine.

In the fifth class is usually arranged the albuminuria of adolescence, on the theory that there is, at about the age of puberty, or a little earlier, a slight physiological hypertrophy of the heart. In the author's opinion, however, in many cases, another element must be considered, namely, that of local renal irritation by a very concentrated condition of the urine, or by the separation of crystalline substances (particularly uric acid and calcic oxalate) from the urine within the renal tubules.

In the sixth, normal albuminuria, so-called, or the albuminuria which appears in perfectly healthy individuals at certain times, such as after strenuous exertion, as in the case of soldiers after a fatiguing march, is also naturally arranged in this class. In these cases the albuminuria lasts for an hour or two only, and, so far as the author knows, is never accompanied with casts in the sediment. Jaundiced urine, of more than a few days' duration, always produces more or less irritation of the kidneys. Wood has never examined a jaundiced urine, even in cases of simple catarrhal duodenitis, which had lasted for more than a few days, without being able to detect a slight trace of albumen, and, in the sediment, renal cells stained with bile-pigment, a few blood-globules, and casts with renal cells, and adherent. If the jaundice last for a long time, it may produce marked pathological changes in the kidneys, as in one case in which the jaundice was due to a malignant growth of the pancreas, which gradually encroached upon the bile-duct. The urine was perfectly free from albumen and casts before the jaundice; these appeared in the urine, however, a few days after the patient became jaundiced, and continued

until death, which occurred some weeks later. On examination of the kidneys, after death, W. W. Gannett found a glomerulo-nephritis. Mechanical irritants, of which the principal ones are uric acid and urates, calcic oxybate and cystin, act by being separated from the urine in crystalline form within the renal tubules, the lining membrane of which they may irritate by their sharp angles and points. Aggregations of these crystals, with mucus and blood, may become lodged in the tubules, increase in size by the depositions of other crystals upon their surface, mixed with blood, mucus, and *débris* of cells, and thus form a renal concretion, which may cause a permanent, circumscribed irritation or inflammation, and consequently permanent albuminuria.

Blood Diseases.—The albuminuria due to changes in the composition of the blood is also accompanied by the presence of renal casts in the sediment. These are almost always purely hyaline in their character, unless the blood-pigment is also separated by the kidneys, in which case we find in the sediment brown granular casts and brown amorphous matter, as in cases of hæmoglobinuria. Wood considers that transient albuminuria is exceedingly common, and frequently occurs in persons who are apparently in perfect health; so that it often happens that it is only detected when an application is made for a policy in some life-insurance company. In many cases the diagnosis of Bright's disease is made, intentionally or accidentally, and it is to the recovery of such cases, after taking some of the so-called "kidney cures," that these nostrums have obtained their popularity.

In a discussion, which followed the reading of Wood's paper, before the Boston Society for Medical Observation, Shattuck said that he had commonly found albumen in the urines of persons over fifty years of age, and his experience had led him to expect to find small traces of albumen and hyaline and granular casts, perhaps pretty abundant, in such urines, whether direct or indirect renal symptoms were absent or not. We constantly see well-to-do persons, who can and will take reasonable care of themselves, live for years happy and useful lives, although their hearts, or arteries, or both, are clearly not in their pristine integrity. The same thing obtains with the kidneys, and it is of the utmost importance for our patients that we realize this fact. R. H. Fitz is impressed by the frequency with which the record of the sedi-

ment of his cases shows the presence of something more than casts, particularly the association of blood with the cases, pointing, it seems to me, distinctly toward a local pathological process in the kidney. We ought to bear particularly in mind the importance of not calling every pathological condition in the kidney Bright's disease where albuminuria and casts are present. This term has led to a great deal of fear on the part of the community. It seems highly probable that many of the cases which Wood has reported are distinctly associated with lesions of the kidney, lesions which are temporary, but destructive, and which will leave alterations in the kidney not sufficient to produce any permanent disturbance of function, but to be found afterward as evidence of pre-existing pathological process. He was particularly impressed with this from the anatomical side. It is very common to see scars upon the surface of the kidney, and thickenings and destruction of the Malpighian bodies, on microscopic examination. After the age of fifty, he expected to find a kidney showing evidence of what may be called local destructive changes.

It seemed to him, with regard to several of these cases which Wood has presented, that, in connection with albuminuria and casts, there was, very likely, at the time of the occurrence, a local pathological process in the kidney,—perhaps an inflammatory disturbance or a necrosis or a degenerative destructive condition,—from which the patients recovered. In fact, they could hardly be said to have recovered, for, at the time of the occurrence, there were no symptoms of renal disease other than an abnormal urine; at the same time, it is not unlikely that there was actual disease of the kidney, very limited, and manifested by the signs described, although there were no symptoms of sufficient gravity to lead either the patient, or his friends, or physician to consider that he was diseased. Cabot recorded that he had seen albumen and casts occur from constriction of the urethra, or neck of the bladder, with disappearance of the symptoms under dilatation of the constriction.

The Albuminuria of Uric Acid and Oxaluria.—Under this title Da Costa,⁵ describes an albuminuria connected with uric acid and of oxaluria. He contends that the more we study albuminuria and Bright's disease the more we are struck with variations from the ordinary type, and the more evident it becomes that

advancing knowledge will separate still other groups than those with which we are at present acquainted. One of these groups with which he is acquainted, and which is inadequately known, is one originating in excessive uric-acid formation, or in oxaluria. He opens by describing a few cases in which there are symptoms of digestive disorder, and in which the disturbed nutrition manifests itself in the urine chiefly by the high specific gravity, urates, albumen, and the casts that are commonly thought to indicate Bright's disease, together with some body-waste, indisposition to physical and mental exertion, fatigue easily induced, an intermittent pulse, cold extremities; and, from the side of the nervous system, the gloom, despondency, irritability of temper, met with in lithæmics, headache and vertigo being also present in some, though far from constant.

Da Costa next proceeds to describe another class of cases, alongside of those just described, in which uric acid and urates are not so dominant as oxalates. The symptoms are, in these instances, in the main the same, but there is often more intestinal digestion, with very marked flatulency, and even a greater amount of nervous depression; in truth, all the well-known symptoms of oxaluria, betraying themselves not only in the digestion, but in the nervous system; otherwise we find the same high specific gravity of the urine with the deposit of oxalates in place of urates, although occasionally they are intermixed, and we retain the same results by sustained treatment, though more slowly.

Entering into details of particular features, the author observes that rigidity of the arteries or even increased tension, which is said to belong to the uric-acid diathesis, as well as to the contracted kidney, is very rarely noted, and the hypertrophic and other cardiac lesions of Bright's disease are conspicuously absent. The same may be said of the dropsies and of the eye lesions; but a symptom worthy of note is a slight rise of temperature in the afternoon,—a fact which teaches us to think of what the kidneys are excreting when we try to explain these slight but long-continued elevations of temperature, seemingly causeless, that we sometimes meet with. The prominence of the nervous symptoms is always very evident. Listlessness, fatigue on the least bodily or mental exertion, forgetfulness, headache, melancholy, sleeplessness, and giddiness may be severally or may be all encountered. Respecting

the urine, the specific gravity generally ranges between 1022 and 1028, but it may be persistently at 1036. The urine on standing often deposits urates, sometimes even uric acid, very often mucus. In the deposits, in place of urates, or alternating with them, we may find, with the aid of the microscope, very many crystals of calcic oxalate. The uric acid does not necessarily manifest itself by the deposit of urates. The total solids are increased. The salts in the urine, other than the urates, are in normal proportion or vary but little; at times the chlorides are increased, and not diminished as they are persistently in contracting kidney. The phosphates are normal or increased; urea is not deficient; it is of natural amount or increased. The relation of the urea to the uric acid is various. If we take 1 of the acid to 33 of urea this proportion may be found unaltered. In the cases with the oxalates, the excretion of urea is usually much augmented. The amount of albumen is generally small, but it varies much with the time of day. Da Costa found it mostly in the morning urine, or in that after breakfast; and, with the ordinary tests, it is at times absent, especially in the evening urine. But here, as in other cases of so-called intermittent albuminuria, there is this fallacy: The albumen is not really absent, but only greatly diminished, for it may often still be detected by the final tests, such as by slightly acidulating the urine with acetic acid and then using picric acid, or by the metaphosphoric acid test. Casts are scanty or altogether absent; in character they are hyaline, or epithelial, rarely granular, never fatty.

Coming to the question of diagnosis, Da Costa finds the main difficulty in the fact that there are cases of contracted kidney with obscure beginnings, in which the amount of albumen is extremely small and at first intermittent, and so often absent that, in one instance, on the post-mortem table, the subject was found to have contracted kidneys, although albumen had only been noticed once in eight examinations. Another form of albuminuria, difficult to distinguish from those of malassimilation, is the dietetic albuminuria. In true dietetic albuminuria, the albumen is only found when certain articles of food are taken, generally in immoderate amounts, such as cheese, eggs, or pastry. This albuminuria has its special periods; it is particularly common after a breakfast or midday meal. It only occurs after an ingestion of food, and then

very quickly. It is worse after mental excitement and exercise, and is unattended by tube-casts. The albuminuria of severe exercise is discriminated from the albuminuria of perverted nutrition by its occurring only after strenuous exercise, and by the absence of all other symptoms as regards the digestive state and the nervous system. One point more: We must be careful how we obtain reaction showing but traces of albumen, to be sure that it is really albumen, and not mucin, we are encountering, for the amount of mucus in heavily-loaded urine is often very great. The kind of albumen discharged is, the author believes, serum-albumen.

The form of albuminuria under consideration is rare among children or old persons; it is common among growing boys; it affects the sexes in an extraordinary disproportion. Bright's disease is much more usual in men than in women, but, in this particular albuminuria, the difference is still more striking. The author has seen but one instance in a woman, and even her case was not entirely free from uncertainty, as she had had scarlet fever some years previously. The albuminuria of boys is, probably, in the majority of instances, that of uric acid and oxaluria. The pathological state that gives rise to this form of albuminuria is important. Da Costa thinks it is essentially a congestion of the kidney, with slight local inflammatory changes in the vascular cortex, from the irritating effects of excreting an increased amount of ill-formed or broken-down tissue in the shape of urea, urates, or these imperfectly oxidized, as oxalates. In other words, the primary fault is not in the kidneys, though the kidneys suffer because they have to throw off the irritating waste-products. Anything that lowers the vitality and disturbs the nervous system may increase the faulty assimilation, and, with it, the irritation and congestion which produce the albuminuria. The question whether this kind of albuminuria ever passes into true organic affection of the kidney is possible, but it is of extremely rare occurrence.

It is held, by some, that most of the cases of Bright's disease originate in uric acid excess acting locally. This view is too sweeping; for even the production of the gouty contracted kidney, in which uric acid plays so important a part, has in it other elements—the general changes that occur in the body, the state of the abdominal ganglia and the condition of the arteries.

In the treatment of the albuminuria of uric acid and oxaluria,

we must bear in mind that we are dealing with a special disease—one in which malassimilation is the main element and the kidney affection only a conspicuous expression. The treatment must not, therefore, be purely that of Bright's disease, but, largely, that of the underlying state,—a state chiefly one we are familiar with, as lithæmia, or oxaluria. The labor of the kidneys must be lessened by close attention to diet. Vegetables, especially green vegetables, and fruits are freely allowed; tea, coffee, and cocoa are permitted, if sweetened but slightly; so are limited amounts of oatmeal, buckwheat- and corn-cakes, rice, bread and butter, oysters and fish. The white meat of poultry and game may be moderately taken, but meats containing much nitrogen, such as mutton and beef, ought, as a rule, to be avoided. Milk is not specially useful, and not more than a pint or two daily should be given.

The author has known an instance in which a permanent cure was effected on a vegetable diet, in which an exclusive milk diet had still left the urine albuminous. Eggs need not be forbidden, if they be not taken constantly, and if the yellow, rather than the white, be taken. Sugars aggravate the symptoms. Among vegetables, rhubarb must be excluded; it increases the oxalates. Salt may be always freely taken. The kidneys must always be well flushed by the free use of pure water, and drinking hot water at bed-time acts, in some persons, very beneficially. Drinking fluids before or soon after breakfast is valuable. Alcoholic drinks ought, as a rule, to be avoided. Baths, not too cold, followed by systematic skin-friction are indicated, and exercise in the open air is very valuable so long as it is not excessive and long-continued. Sea-air does the general health good, but sea-bathing may increase the albuminuria. It is important that the patient should not make much exertion in the early part of the day. Young people who have the complaint ought not to be pushed in their studies. Among medicines, laxatives are very important. An occasional blue pill or a grain or two of calomel preceding salines may be recommended. In cases with oxalates, nitromuriatic acid remains a standard remedy. We must not in any case overlook the heart. The heavy work thrown on the kidneys, the general bad nutrition which comes from poorly-oxidized elements circulating in the blood, and the lowered nervous force disturb the heart, and the irregularity it exhibits may have to be met by digitalis or strychnine.

Arterio-Capillary Fibrosis (Bright's Disease).—A. G. Auld remarks ⁶_{Nov.} on the state of the vessels of the pia mater in Bright's disease. Accepting the new term "arterio-capillary fibrosis" as most expressive, pathologically, of chronic Bright's disease, in which the vessels throughout the body have had their outer coats thickened, could describe the condition of the pia mater of nearly all the brains removed for examination in the post-mortem room of the Western Infirmary, Glasgow, during a period of eighteen months. From this labor he draws the following conclusions: 1. The hyaline-fibroid thickening of the outer coat of the vessels is not of the nature of an exudation or deposition of a foreign substance, nor yet a transformation of existing structures. 2. The effect of reagents is, after all, but unimportant. 3. The thickening of the outer coat is unquestionably due to proliferation of connective-tissue corpuscles imbedded therein, leading to new formation of tissue; in short, is a slowly progressing periarteritis. 4. This change is probably general throughout the entire tissue of the pia mater. 5. The muscular and inner layers of the vessels show hyperplastic changes at first; latterly, atrophic and degenerative changes set in.

In the case of the smaller arterioles their muscular elements were certainly increased in volume, if not also in number, and their delicate investment of connective tissue was represented by a thick, homogeneous-looking cylinder. It is particularly to be noted, however, that their endothelial lining showed no deviation from the normal, in this respect presenting a marked contrast to the condition prevailing in the larger vessels. The diameter of the channels in these thickened arterioles suffered great diminution; not infrequently it measured just the diameter of the wall. Such a diminution suggests an adequate explanation of the cardiac hypertrophy in chronic Bright's disease.

In another paper by the same author, before the Glasgow and Perth Clinical Society, ²¹³_{May} reference is made to the state of the skin in Bright's disease. His microscopical section showed that the muscular coats of the arterioles are much thickened. This is generally to be observed. In one case, in which the œdema was a very marked feature, the derma is unduly cellular; clusters of leucocytes seem to be scattered throughout its substance. It seems as though some inflammatory process were at work, and hence we

find here considerable support to the view of Cohnheim as to the cause of this form of œdema.

Cases of chronic Bright's disease are divided into two groups, so far as the lesions of the kidney itself are concerned. "In one the lesions of the glomeruli and of Bowman's capsule are very marked, and overshadow the other lesions; in the other class the reverse holds good." The changes in chronic glomerulitis are thus described:—

"1. The epithelial cells covering the glomeruli swell and assume a peg-top or columnar shape, they then fall into the periglomerular space and assume a rounded form.

"2. A similar desquamation of the cells lining the capsule occurs, but without the intervention of the columnar shape.

"3. The connective-tissue nuclei, and likewise the nuclei of the capillary walls of the Malpighian tufts, germinate, multiply, and give rise to a new growth of tissue between the capsule and the tuft, the capillaries undergoing hyaline thickening the while. In one specimen we see a band of new tissue stretching across the periglomerular space, to which numerous epithelial cells have attached themselves,—a phenomenon which has been questioned by Ziegler and some others.

"4. Not infrequently the capsule itself becomes split up into several layers, giving the appearance of two or more capsules for part of its circumference. This dissecting process is accomplished by cells from the surrounding connective tissue. In other and more advanced cases the capsule appears striated and concentrically thickened, and blends with the sclerosed, glomerular tuft.

"It is difficult to see why these lesions should occur in some cases and not in others; they are by no means confined to scarlatinal cases; and, moreover, in post-scarlatinal nephritis which has assumed a chronic form they are occasionally absent."

Coats, on discussing the above paper, held that the arterial changes are secondary, and that the increase of the muscular coats is a physiological process, "to prevent overloading." He could not accept that the epithelium should suddenly change its function and produce water, the epithelium, in chronic Bright's disease, being as far as possible from any opportunity of secreting water.

Augustus A. Eshner ²¹⁰⁶_{Mar. 11, '91} reasons that the etiological elements concerned in the production of arterio-capillary fibrosis are com-

prised in the group of noxæ, which we now know as toxic and infectious, and include syphilis, alcoholism, lead poisoning, gout, rheumatism, and infectious diseases in general. Heredity, too, plays an important part. The most conspicuous symptom is shortness of breath on exertion, brought about by cardiac incompetency. Other visceral symptoms are due to changes of a similar nature in the respective organs.

Albuminuria After Epilepsy.—That albumen sometimes appears in the urine of epileptics, after a paroxysm, is a fact known to most physicians who are in charge of epileptics; but J. Voisin and A. Péron infer, from their researches, ⁹⁴_{MAV} that in 50 per cent. of persons affected with epilepsy there is some albumen present in the urine when the paroxysm is over. As a general rule, the quantity is large or small in amount, according to the intensity and number of the fits, the increase of it bearing a proportion to the severity, and being largest of all in cases where the cutaneous cyanosis and congestion have been most demonstrated. The maximum excretion takes place during the first two hours after the end of the paroxysms.

Albuminuria Complicating the Acute Stage of Blennorrhagia.
—Balzer and Souplet ²⁸⁷_{MSA} report on 422 patients who had been under care in hospitals during six months, affected with blennorrhagia. Albumen was demonstrated in 113 cases, but in 4 it was in relation with hæmaturia. In 29 cases the blennorrhagia was simple; in 62 it was accompanied with orchitis; in 11, with orchitis and cystitis; and in 3 with cystitis alone. The authors distinguish two classes of cases,—one in which the affection evolves in a latent fashion, and in which the albumen persists six or seven days; the second, more rare, in which there is gastric disturbance, which lasts as long as the albumen is present, and is attended with great nervous disturbance and depression, with fever oscillating between 38° and 39° C. (100.4° and 102.2° F.), and, in the event of orchitis, persisting a long time, often after this complication.

Bright's Disease with Cardiac Hypertrophy.—Jerome B. Thomas ¹⁵⁷_{SEP} directs attention to the complication of Bright's disease with cardiac hypertrophy. After giving the clinical history of a case, he comes to the conclusion that, whatever the explanation may be, it is a clinical fact that more than half the cases of nephritis induce hypertrophy of the left ventricle of the heart; and

in contracting kidney the proportion is even greater. This may or may not be accompanied by a general thickening of the walls of the vessels throughout the body,—the so-called arterio-capillary fibrosis,—which condition some have regarded important in the causation of hypertrophy. Flint points out that this increase of cardiac propulsive power is largely compensatory for the loss of renal function incident to the small, granular kidney; the compensation, however, being less complete for the excretion of solids than for that of the water-urine. In the case under the care of Thomas, the cardiac hypertrophy reached its limit in dilatation, giving rise to a weak, incompressible pulse, instead of the bounding, high-tension pulse characteristic of the earlier stages of contracting kidney. The heart was too weak to do its work, and, as a consequence of its failure, the circulatory equilibrium was broken, with the inevitable sequelæ of venous engorgement of the lungs and of the portal and general capillary systems, evidenced by dyspepsia, dyspnœa, and œdema. The dilatation disturbed the normal relation of the mitral valve to such an extent that the valve became insufficient and mitral regurgitation was established. This condition was undoubtedly the chief factor in the dyspnœa. With the kidneys failing to eliminate their most noxious elements, the liver and alimentary tract failing to supply them with an adequate amount of nutritive material, and, finally, with the albuminous constituents drained away at the rate of 62 grains (4 grammes) a day, it could not be expected to find the blood in any other than a diseased condition. The intense pallor of the face, the ashen hue of the mucous membranes, and the general fault of nutrition testified to the depraved blood. As a matter of pathological interest, the author analyzed the patient's blood with reference to the quantity of hæmoglobin, which he found reduced from the normal proportion of 14 per cent. of the blood-weight to 8 per cent. He also counted the corpuscles and estimated the number of red blood-cells in a given quantity of blood, to find the proportion to be 4,200,000 to the cubic millimetre, a proportion which, at first glance, appears near the normal rate, and inconsistent with the results of the hæmoglobin test and the evident poverty of the blood. This, however, is readily explained by the escape of the fluid elements of the blood into the cellular tissue of the body, leaving the blood reduced in volume, with a decided increase in the relative propor-

tion of the corpuscular to the fluid constituents. The apparent anomaly in regard to the number of red blood-cells points out another condition of interest, viz., that the individual red cells are poor in hæmoglobin.

To sum up: The blood was diminishing in volume in the number of red cells and in hæmoglobin, and the body, being dependent upon so impoverished a medium, both primary and secondary assimilation were bound to be profoundly disturbed, and the heart and kidneys still further embarrassed in their task, by inadequate nourishment. Thomas, speaking of the etiology of this disease, attaches much importance to climate. A cold, moist atmosphere has the effect of habitually depressing the function of the skin, and thus throwing an unnatural burden upon the kidneys. The prognosis in these cases is very serious. The principal lines of treatment are to support and stimulate the failing heart, to enrich the impoverished blood, to maintain the activity of complementary organs, and prevent the obstruction of the uriniferous tubes.

Alcoholic Heart-Failure in Bright's Disease. — Graham Steell⁹⁰ reports the case of a cloth-worker, but later a professional singer, who was admitted into the Infirmary at Manchester in 1891, with shortness of breath and dropsy. His illness began two months before admission, by shortness of breath, to which he had been subject in a lesser degree, swelling of his lower limbs and abdomen, loss of appetite, indigestion, frequent vomiting, and palpitation. He was a heavy drinker, taking both beer and whisky. He had never had rheumatism. On admission, he had erythema of the nose; body fairly well nourished; lower limbs swollen; ascites; liver much enlarged and indurated, though smooth; heart dilated, systolic murmur at the apex; urine contained a considerable quantity of albumen and casts. Patient was kept in bed and put on a nourishing diet. Medicinally, he was ordered 10 minims (0.65 gramme) of the tincture of nux vomica three times daily, and 1 grain (0.065 gramme) of digitalis. For a little time, nitrate of caffeine took the place of the digitalis and nux vomica. The man made rapid progress toward recovery, and was discharged on January 2, 1892, relieved of his cardiac symptoms. Steell points this out as a good illustration of the fact that cardiac failure is not always a fatal complication of Bright's disease, and he quotes other cases that have been under his care which support this view.

Hemialbumosuria.—Westmoreland,⁶ found, in a patient—a lady—suffering from influenza, symptoms of frequent micturition and an uneasy pain, which seemed to be about the neck of the bladder. On testing the urine with the nitric-acid test, it became cloudy; but, as it became clear on boiling, he put it aside. A month afterward, on a return of the symptoms, he tested again, and obtained the same results; but, accidentally looking at it the next day, he noticed a deposit in the tube. Boiling the specimen again, the precipitate once more disappeared, but fell again on cooling. On further treating the specimen with nitric and picric acids, and the biuret reaction with potassio-cupric tartrate solution, he concluded that the urine contained hemialbuminose; and this condition has continued. The specific gravity of the urine has ranged from 1012 to 1015; its reaction has been slightly acid, and, under the microscope, no casts or tubules have been found, and nothing but amorphous urates have been discovered. Westmoreland thinks that this condition of urine may be more frequent than is generally supposed. When one tests for albumen with nitric acid, and finds any slight cloudiness disappear on boiling, the urine is generally cast away, and no more attention is paid to it. He confesses that his own attention was only accidentally directed to this condition of the urine, on casually looking at his test-tube rack the following day after he had tested it in the ordinary way. Westmoreland is not the first person who has been similarly deceived.

Treatment of Albuminuria.—Parker³³⁹ relates the history of a cigarmaker, aged 44 years, who was unable to work for three months, and who had œdema of the lower extremities up to the scrotum. The urine showed about one-third of albumen in bulk. He was vomiting his food, was failing in strength, and losing in weight. The diagnosis was albuminuria, with commencing uræmia. He was put at once on 5-grain (0.32 gramme) doses of diuretin (Knoll), once in three hours. After twenty-four hours of this treatment the volume of the urine was increased threefold, the respiration became more regular, and the œdema began to disappear. The author believes that when symptoms such as these depend on simple congestion of the kidneys, due to some purely local change in the venous trunks or structures of the organ, such as may be induced artificially, the diuretin will prob-

ably relieve the congestion; but, if congestion should pervade all the parts of the kidneys, the action of the drug will only be temporary for good. Poulet³³_{July} is enthusiastic on the treatment of albuminuria by *strophanthus glabrus*, of Gaboon, in doses of 0.10 to 0.15 gramme ($1\frac{1}{2}$ to $2\frac{1}{8}$ grains) a day, following upon abstraction of blood. He supplies notes of four cases of an extreme kind, in which much benefit followed the use of the drug. The dangers which other practitioners have seen from it have never occurred in his hands, large as the doses administered have been. He considers the remedy a therapeutical conquest most valuable, which the medical body will appreciate more and more as they see its value. Semmola, in a note to the Academy of Medicine,³_{Sept. 12} reports, apropos of the recent communications made by Dujardin-Beaumetz and Germain Séé upon the alimentary *régime* and treatment of albuminuria, and especially of the albuminuria of Bright, reports that he has come to the following conclusions: (1) that the quantity of albumen passed in twenty-four hours is considerably modified by the alimentary *régime*; (2) that, under the influence of an exclusive animal-flesh diet, the quantity of albumen eliminated in twenty-four hours is nearly doubled; (3) that, under an exclusive vegetable and feculent diet, the albumen is considerably diminished and is reduced to a third part of the quantity eliminated under a *régime* of mixed animal and vegetable food. It was from these facts he was brought more tardily to adopt milk as the typical food in Bright's disease.

Germain Séé³_{Aug. 21} recognizes five forms of albuminuria: (1) the functional or physiological; (2) the cardiac, under the effect of circulatory embarrassment,—mitral, dilatative, degenerative, and not implying the existence of any disease of kidney; (3) the organic, connected with a parenchymatous nephritis, acute or chronic, or an interstitial nephritis, or a mixture of the two varieties; (4) the hæmatogenous, arising from an alteration of the blood, in which the albumen may be more diffusible, more easily filtered, or non-assimilated; (5) the *toxique, bactérique, toxinique*, or *ptomain-urotoxique*, produced by the action of various agents, such as mercury, lead, phosphorus, cantharides, when a toxic agent is the cause. In the treatment of these several kinds of albuminuria, by diet or regimen, it is necessary to remember that the affected kidneys eliminate much more slowly than healthy kidneys the

nitrogenous part of the products of the decomposition of albumen. That is to say, there is a retardation of elimination; consequently, the work of the kidney should be eased or relieved, for which reason 60 to 70 grammes (2 to 2½ ounces) *per diem* of albumen are amply sufficient.

HYDRONEPHROSIS.

W. J. Collins² draws some very important generalizations from his experience of cases of traumatic origin: 1. Traumatic hydronephritis, or hydrorenal distension (the latter a much better definition), the result of the proximate or remote effects of injury upon the perviousness of the ureter, must be distinguished from encysted extravasated urine, causing loin tumors, the result of partial or complete ruptures of the ureter. 2. It may arise acutely from blood-blocking of the ureter, more slowly from bruising, possibly from results of pelvic fracture. 3. It may end in spontaneous cure. Massage may facilitate the restoration of the perviousness of the ureter. 4. Aspiration is valuable to relieve dangerously rapid kidney distension following injury. 5. When there is reason to believe that the condition is one of pyo-hydronephrosis, and where nephrectomy is inadmissible, and when the patient's general health is suffering, nephrotomy, stitching the sac to the parietes, and drainage are indicated. 6. In pseudo-hydronephrosis from ruptured ureter, incision and drainage must almost certainly be called for, sooner or later, by inflammatory consequences; and if, at the operation, it is evident that the rupture of the ureter is such as to render the likelihood of restoration of function improbable, the removal of the kidney would be strongly indicated.

Terrier and Baudouin⁹¹ report on thirty-three instances of intermittent hydronephrosis. They found it more frequent in the female than the male, and connected, in a majority, with displacement of the affected kidney, owing to mechanical derangements. The symptoms are acute pain, with appearance of a tumor in the side, and diminution in the secretion of urine,—symptoms caused by a bending or kink of the ureter. The symptoms may last nine hours and cease suddenly. It may be necessary, however, in prolonged cases, to perform nephrectomy.

Kidney Affection Resembling Raynaud's Disease.—Howard Marsh² described, at the Clinical Society of London, the case of an unmarried woman, aged 25, presenting the usual symptoms of

a stone in the left kidney, and urine containing pus and blood. He cut down upon the kidney to explore, making the incision in the mid-axillary line, in order to gain more room. He found nothing, and, as the symptoms continued, he subsequently cut down in the middle line of the abdomen. He then discovered that the kidney was freely mobile, and was withdrawn out of reach when the deeper parts of the wound were retracted. No stone, however, was found, but, as the kidney was atrophied and useless, it was removed. The patient made a good recovery, and was discharged in September, 1886. After removal, the kidney was found to contain three calculi, so small that they might have passed without difficulty. A month later the patient was re-admitted, with pain in the right kidney. There was typical renal colic, with almost total suppression of urine. In January the right kidney was explored, but nothing was found. The symptoms, however, subsided and the patient went on well, but had occasional attacks, and was again admitted to the hospital after one of unusual severity. The kidney was again exposed by an incision through the right linea semilunaris; it seemed healthy and moderately hypertrophied; there was no dilatation of the ureter. Matters then went on as before, with occasional attacks, when, after some months, the kidney was again explored; the ureter was opened two inches below the pelvis of the kidney, and a long probe passed down it. No obstruction was found. The substance of the kidney was incised so that the pelvis and calices could be explored with the finger, but still nothing was found. The patient gradually sank, and died on the 17th. At the post-mortem an opening was found in the cæcum, due to ulceration of the vermiform appendix. The right ureter was a little dilated and bound down by fibrous bands to the cæcum. The symptoms were presumably, due to some profound vasomotor disturbance similar to that associated with Raynaud's disease, although they had not the same pathology. The case belonged to a group in which severe paroxysmal pain and various symptoms referable to the kidney might be present, but of which no adequate explanation could be given.

Mansell Moullin², related the case of a woman, aged 34, who had renal colic for two years, and was an inmate of several hospitals. At length, when admitted to the London Hospital, two of

the speaker's medical colleagues thought the case one of true renal colic. Hæmaturia had been severe two weeks before admission, and then decreased. She had dull pain across the loins and sharp pain over the right kidney, with profuse hæmaturia or hæmatinuria. The urine was of very low specific gravity, and she was thought to have interstitial nephritis. The right kidney being explored from the loin, nothing abnormal was found in it. At first she was relieved, then paroxysms of pain returned, with hæmaturia; the strength failed, and death occurred on the tenth day after the operation. At the post-mortem examination no artery was found to have been wounded, nor was any calculus found. Both kidneys were small, contracted, and granular, but there was nothing which would in any way account for the symptoms.

Tuberculosis.—Renal tuberculosis forms the subject of an article by Tuffier.³⁶⁰ The author recognizes two forms of renal tuberculosis—tuberculous and miliary. The tuberculous form, which is most common, he subdivides into (a) pyelonephritis; (b) tuberculous nodules, deep in the kidney; (c) tuberculous hydronephrosis; (d) large or massive tuberculosis,—the two last being due to tuberculous ureteritis. He considers that changes in the ureters, consisting of ureteritis and its sequelæ, and of obliteration of the ureter, more or less complete, are lesions very often overlooked, although their consequences are serious. In ureteritis there is pyuria; in obliteration there is enlargement of the kidney. When the kidney is not structurally involved in tuberculosis, hydronephrosis will be set up; but when it is invaded by tubercle, stage by stage, there will be tuberculous degeneration and formation of pus. In a case named by the author, where there were no renal symptoms, a kidney was found to be tuberculous on bacteriological examination.

URÆMIA.

Uræmia with Pyrexia.—Huchard⁹² has met with a case of uræmia in which, during the symptoms, the temperature was raised. He considers this so exceptional that he records it as deserving of special attention. The patient, 27 years of age, was brought into the Hôpital Tenon on February 27th, with uræmic coma. He had been under alcohol, but not in an extreme degree, and there was no indication of poisoning from lead. He showed

epileptiform convulsions, which were easily induced by moving or lifting him, the skin being hyperæsthetic and the muscles very excitable. The temperature was 99° F. (37.2° C.), but it rose until, on the third day, it reached 104.5° F. (40.3° C.), comatose and convulsive states recurring from time to time. The urine was rich in albumen. A saline purgative was prescribed, and blood was drawn by leeches from the head, but death followed on the third day. At the autopsy the kidneys were found contracted and fatty, with granular degeneration, adherent capsule, and atrophy of the cortical structure. There was also some thickening of the capsule of the liver, without cirrhosis. The other organs of the body were healthy.

Cutaneous Eruptions with Uræmia.—In a discussion at the London Clinical Society on “Uræmic Eruptions,”^{Nov. 21, 91} the subject was opened by Le Cronier Lancaster, who drew attention to an eruption which occurred principally in cases of chronic interstitial nephritis, first appearing as maculæ and papulæ of a bright-red color upon the extensor surfaces of the hands, forearms, and legs, and then rapidly spreading over the whole body. In a few days one of three changes occurred in the rash: (1) it gradually subsided, with extremely free desquamation, leaving the underlying skin brawny and thickened; (2) it became eczematous with free exudation of a gummy fluid, which dried and formed scabs and crusts; (3) in the severer cases, pustulation, or even the formation of small abscesses, followed the eczematous stage; severe itching usually accompanied all stages of the rash; the eruption was generally of grave prognostic significance; in seven out of the eight cases, it was followed by death within five weeks from its first outbreak. Mott mentioned the case of a man suffering from uræmia. Three days before death he had a well-marked erythematous rash, associated with jaundice, which Mott then considered due to jaundice, but which he now, after the reading of this paper, recognized as being probably due to the uræmia. There were, at any rate, in that man’s blood ten times as much nitrogenous waste-products as in normal blood. Barlow had seen a case of the kind described by Lancaster, and which, in its course, resembled a “dermatitis exfoliativa.” Pye-Smith had mentioned observing similar rashes in cases of Bright’s disease, which, however, were probably not “uræmic” in the ordinary use of the term. His (the speaker’s) case

had certainly died a few weeks afterward, after the rash had quite disappeared. The cases did occur with chronic interstitial nephritis, but without other concurrent symptoms, which could by any stretch be ascribed to uræmia. The president thought the paper would direct attention to the rashes of Bright's disease. He had, of course, seen such cases, and had always considered them due to the poison circulating in the blood. Patients suffering from Bright's disease seemed to be peculiarly vulnerable to iodism.

Treatment.—Renwick R. Ross,¹ reports a case of uræmia treated by abstraction of blood at the Presbyterian Hospital, in New York. The patient was a woman, stout and plethoric. She had general anasarca. Her tongue was loaded with a heavy brown fur; she breathed with much difficulty, and in both lungs were sibilant and sonorous râles. The sounds of her heart were feeble and distant, and the pulse of very high tension. The urine was diminished and contained albumen with granular and hyaline casts. On November 4th she had uræmic convulsions, which continued throughout the day with increasing severity. The pulse continued of high tension, notwithstanding the administration of nitro-glycerin hypodermatically. During the entire night she was very restless, convulsed, or tossing about in wild delirium. Toward morning she developed a condition of alternating coma and delirium. The tension of the pulse remaining high, and all the symptoms becoming more grave, she was bled from the arm to 20 ounces (600 grammes), the blood being much darker than natural. The effect was instantaneous. The patient lapsed from restlessness into a calm sleep. This continued for three hours, and on waking she was perfectly conscious; the natural flow of urine soon became established, and in two days the dropsy had entirely disappeared.

The author observes that, although the pendulum of public opinion has swung to extremes, and blood-letting is out of date with the profession, he believes that the practice accomplishes a valuable purpose in cases of the above nature, where there is a pulse of high tension. The operation gives almost immediate relief, diminishes the pressure on the kidneys, and allows their normal function to become somewhat established; the overstrain on the heart is relieved, and the general condition improved.

The treatment of uræmia, first by the subcutaneous injection of the glycerin-saline extract of the cortical portions of the fresh kid-

neys of guinea-pigs, and afterward by oxygen, is reported by Dieulafoy.¹⁰⁰ The patient was a man, 41 years of age, who suffered from well-marked uræmia and pulmonic œdema with suppression of urine. The first injections, which were repeated three times daily, seemed to be attended with good effect, as the coma passed away and the kidneys returned to action, the favorable condition lasting for three days. Unfavorable symptoms then set in again, and the patient succumbed.

NEPHRITIS.

Matson¹⁶¹ points out that each tubule is a kidney complete in itself, and in this fact finds an explanation for the insidious character of some forms of disease of the kidney, when it fastens upon a part of the tubules in the first place, and leaves the others to continue the urinary function. The lesions are always found to have their primary seat in the cortex, and it is, therefore, a fair presumption that the origin of the disease is connected with the excretion itself. This is evidently true in nephritis from lead or phosphorus poisoning, and it is possible that, in every case, the disease arises from the necessity of separating some substance from the blood which is injurious to the renal structure. The author does not conceive that exposure to cold could directly affect the kidney more than other organs, but it is easy to believe that in infectious diseases, during their sequelæ, foreign products in the blood may prove injurious to the kidney. The connection of hypertrophy of the heart with Bright's disease he considers causal. It develops in response to a condition of the blood in which the substances to be removed from the kidneys tend constantly to exceed the proportions compatible with health. The hypertrophy of the heart is compensatory to the destruction of a part of the kidney just as much as in valvular disease. By this means the blood is driven at a higher pressure through the lessening intact part of the kidney, which in this way can act on as great a proportion of the blood as in health. Bearing on the morbid anatomy, Matson thinks that the best division is into acute or chronic parenchymatous and interstitial nephritis, the interstitial form being most insidious, and presenting the greatest difficulties. If there be hypertrophy of the heart without defect in its mechanism, arterio-fibrosis, accentuation of the second sound of the heart over the aortic area,

with persistent low specific gravity of the urine, that is, with a persistent deficiency in the quantity of solids which the kidneys ought to excrete, the diagnosis of interstitial nephritis is justified. Albuminuria never exists without disorder of the kidneys, but the disorder, like cyanosis in heart disease, is generally secondary.

Shaw, referring to the detection of albumen in insurance practice and as bearing on Matson's paper, describes two cases in which the urine showed a faint cloud of albumen with tube-casts. Both these persons were, however, considered healthy by their physicians, yet were both dead in the course of a few months. Batten, commenting on the same paper, expressed the opinion that a man may have only one kidney attacked with chronic nephritis; and, in such a case, the prognosis would be favorable. Matson has never seen such a case.

Nephritis Following Skin Disease.—Leonida Cunal⁷⁶²_{Nov., 71} reports four cases of acute nephritis following impetiginoid eczema. In all the cases, the urine was rich in albumen, and contained renal tube-casts and epithelium. One of the cases died. Decio Felici, who has had two cases of nephritis from eczema, thinks that the eczema allows pathogenic organisms to enter the circulation and produce the renal irritation, as the amount of skin involved in eczema is too small to interfere seriously with the natural eliminating function of the skin.

Epistaxis in Chronic Nephritis.—Bright noticed epistaxis in chronic nephritis; and M. H. Barth,¹⁷_{Aug., 20} commenting on this matter, says that there are, in truth, three conditions which contribute to epistaxis in advanced nephritis: (1) interstitial nephritis, of the toxic kind, in arthritic subjects; (2) when there are alterations of the blood, anæmia, or hydræmia; (3) modifications of the walls of the renal blood-vessels, which facilitate hæmorrhages and render them graver. After a first epistaxis, the cicatrization of the broken vessel is less secure, the hæmorrhage is less congestive, as dependent on the rupture of the minute vascular tubes. In treatment he recommends, for preventive: (a) absolute milk diet; (b) bromide of potassium; (c) purgatives every week, if the renal function is insufficient. Later on, he allows eggs, vegetables, and white meat well cooked. He prohibits red meat, wine, and fat soups as veritable decoctions of poisons.

Choleraic Nephritis.—Aufrecht⁸¹⁹_{Nov., 19} reports three cases of

cholera where death took place in the algid stage of cholera, and of another case where death took place from uræmia. In every instance, what he calls cholera bacilli were obtained by cultivation from evacuations. In all the cases, the kidney was considerably changed in character. The renal cortex was hyperæmic. There were some extravasations of blood, and the lumen of the tubules was widened, as a consequence of changes in the epithelium. Still more important changes were found in the medulla, and especially in the papillary region. Hyaline cylinders were seen in the collecting tubes and in the looped tubules of Henle. These casts were surrounded by flattened epithelium, and the renal epithelium presented granular masses. Aufrecht considers that the changes in the medulla were of an inflammatory character. In the patient who died of uræmic convulsions, about the ninth day, no algid state had been observed. Changes also had taken place in the brain; the membranes were injected, the convolutions flattened, and there was œdema of the cerebral substance. The spleen, also, was considerably enlarged, being twice the ordinary size. The kidneys were enlarged; the capsules peeled off easily; the cortex was widened, dull, and pale red; while the medulla was deep red; and the microscopical appearances were similar to those seen in the kidneys of the patients who died during the algid stage. The author considers that choleraic nephritis may occur, without the algid stage, with marked changes in the papillary portion of the kidney. He does not think that the affection of the kidney is due to mere thickness of the blood, but that some poisonous substance is absorbed by the blood, which injures the epithelial elements of the kidney, and that the changes in the renal cortex are best explained by stagnation of urine in the tubules, in consequence of the obstruction caused by the casts.

Nephritis and Granular Kidney After Pneumonia.—Eisenlohr⁶⁹ reports a case of acute nephritis, in a patient suffering from acute pneumonia. On the eighth day albumen was found in the urine, with red blood-cells, urine-casts, and leucocytes. As she became convalescent from the pneumonia, she suffered from œdema. Some months later the amount of urine passed was abnormally large, of low specific gravity, and containing a little albumen. There was also some increase in the arterial tension, a phenomenon that had not marked the acute stage of the disease.

She died, ultimately, of uræmia, nine months after the pneumonic seizure. At the necropsy, the kidneys were found to have undergone the ordinary red granular degeneration, and there was some hypertrophy of the heart, which, the author thinks, was due to the short duration of the disease; as, also, examination of the urine previously to the pneumonia showed the absence of albumen, he thinks there was contraction of the kidney, without previous enlargement, and that this is the first recorded case of acute nephritis resulting from pneumonia.

Leven, ⁶⁹_{May 10}, treating on contracted kidney, considers that the disease of the renal arteries—a fairly constant condition—need not extend to the arteries of the body at large, but there are some portions of the arterial system which are commonly, if not always, involved. The vessels of the heart are, in point, a *pia mater*. Leven, himself, has always found the small arteries of the spleen sclerotic, the reticulum thickened, and the cells degenerated. The heart, when hypertrophied, is almost always so on the left side,—a condition due to the vascular resistance. The changes in the kidney are, he thinks, caused by a deficient supply of blood, and he has generally found, in his cases, the urine reduced in quantity; changes in the eye he considers rare, in arterio-sclerotic contracted kidney. The disease is most common amongst men, and may be developed without any obvious sign of acute nephritis.

Chronic Nephritis.—F. Delafield, ²³³₁₈₇₂ says that there is hardly any limit to the variety of the disease, and sums up the constant symptoms as anæmia and dropsy, with albumen in the urine. There are seven classes of cases, according to this author: 1. Where the anæmia, dropsy, and albumen are constantly present, and the patients die with dropsy or chronic uræmia within one or two years. 2. Where anæmia, dropsy, and dyspnœa come on periodically, the patients being comparatively well between the attacks; the urine always containing albumen. 3. Where, for a number of years before death, the patient has an attack of dropsy, from which he apparently recovers and returns to work, but with urine of low specific gravity and containing albumen at times, the case ending with a sudden return of the characteristic symptoms. 4. Cases which for years have no symptoms except pallor of the skin, and urine of low specific gravity containing albumen. 5. Cases in which the first symptom is an attack of spasmodic

dyspnœa with recovery, and an interval, perhaps of years, before the renal symptoms are developed. 6. Cases affording a history of chronic endocarditis, lasting for years before the affection of the kidney appears. 7. Cases which apparently recover.

Delafield is of the opinion that in chronic nephritis climate and mode of life constitute the important parts of the treatment. He is doubtful if drugs exert any effect on nephritis. A warm, dry climate and an out-door life are of the greatest importance.

Nephritis in Infancy.—L. Emmett Holt ¹_{Dec. 12, '91} reports two examples of acute primary nephritis, both terminating fatally, in infants aged, respectively, 6 and 13 months. Neither child had had scarlet fever or any other infectious disease. The symptoms had developed suddenly without any assignable cause. The prominent ones had been a prolonged period of high temperature, lasting in one case twenty-one days, and in the other seventeen days, the fever ranging from 101° to 105° F. (38.3° to 40.6° C.). There had been dullness, prostration, and anæmia, but no suppression of urine and no dropsy. Death had taken place from exhaustion. At the autopsy all the organs were found normal except the kidneys, which exhibited the lesions of acute nephritis to a very marked degree.

Chronic Nephritis and Pulmonary Tuberculosis.—S. I. Radcliffe ⁹_{Apr. 16} expresses the belief that, when a person has suffered in early life with all the symptoms of pulmonary tuberculosis, the progress of which was soon arrested or aborted, leaving behind no sufficient physical signs to indicate its former existence, and afterward living a healthy life for a long period, dying later of chronic nephritis, the question arises whether there was any connection between the two diseases. He then gives some cases illustrating this state of things, and concludes that this conjoint or conjugate pathological condition is common, if not general, and, if so, a common bacillary origin may also be admitted. The question is, whether the same morbid material, whether bacillus or other infection, missing the lungs in its ingress, can pass on and set up in the kidneys the same pathological process, and produce such an organic lesion as would have developed from a lodgment in the lungs.

Diet in Chronic Nephritis.—Dujardin-Beaumetz ³_{Aug. 21} discusses the dietetic management of chronic nephritis. The treatment consists in facilitating excretion of toxic elements by the kidney and

the reduction, as far as possible, of their formation in the system. Purgatives and diuretics perform the first part of this treatment, intestinal antiseptics the second. All animal food is forbidden except eggs, which have no effect on the urine; the albumen of eggs differing from that passed in the urine, and causing no increase of uric acid. Amongst vegetables, cabbage should be excluded, but other vegetables and cooked fruits may be taken freely, and large quantities of milk may be administered. Fresh fish may be taken, but no fish which has undergone the slightest decomposition, and which contains toxic elements, should be permitted.

Bearing on the same subject, Luther Sexton⁸¹ recommends, in the dietetic treatment, skim-milk and vegetable diet. He specially commends the milk diet, from the fact of milk being a gentle diuretic, as well as a nutritious food,—fresh milk from the cow, combined with lime-water or seltzer-water, butter-milk and skimmed milk alternately, so as to give variety. As there is anæmia, he thinks some preparation of iron indicated; but any internal medicine which deranges the digestion should be stopped at once. The best alternative preparation he has used is arsenite of copper, which, in $\frac{1}{100}$ - to $\frac{1}{1000}$ -grain (0.0013 to 0.00065 gramme) doses, has a marked effect in reducing albumen in the urine; but the effect is transitory, and, as soon as the albumen returns, the medicine should be stopped. In his hands, 4-grain (0.26 gramme) capsules of fuchsin, three times daily, have reduced the quantity of albumen in several cases, and they are well borne.

LITHÆMIA.

Stewart Lobinger,⁹ referring to the many questionable theories concerning the production and elimination of uric acid, considers some of the well-defined clinical facts that have been forced upon his notice by the frequency with which he has encountered the condition designated as lithæmia. The causes of lithæmia he summarizes as follows: (1) improper food, producing acid digestion; (2) indulgence in beer, wine, and spirituous liquors; (3) lack of proper air and exercise; (4) various nervous influences; (5) inherited dyscrasia; (6) any influence that tends to diminish the alkalescence of the blood, or that overworks the hepatic cells and arrests the complete oxidation of proteid material. The mere presence of uric acid, *per se*, is no evidence that this sub-

stance has been produced in excess. It is simply thrown out of solution by a relative diminution of the alkaline basis of which the uric acid is combined. Lithæmia must be caused by a chronic impairment of digestion before it can be strictly classed as pathological.

No cause operates so constantly in producing a lithæmic condition as excessive indulgence in sugars, starches, and fats. Such a diet is apt to be followed by acid indigestion, languor, flatulence, and constipation. In the majority of cases, there will be either the rheumatic or neuralgic pains, especially if there are very large deposits of uric acid and oxalate of lime. The conversion of farinaceous substances into glycogen and the emulsifying of fats is at once arrested; fermentation results, and lactic, butyric, and other abnormal acids are formed. The absorption of these acids brings about a pathological condition of the blood, characterized by diminished alkalescence; and this change in the blood has probably an irritating effect on the liver and brain that tends to prolong and aggravate the lithæmic state. All kinds of alcoholic stimulants, however mild, lead to relapse of the affections and disappointment of both patient and physician; and many cases continue incorrigible, because liquors are clandestinely taken and it is impossible to enforce prohibitive measures. Great attention has to be paid to diet in the treatment of these cases.

The foods allowed to lithæmic subjects are: eggs, broiled meat, fish, oysters, game, and fresh vegetables. Milk, cocoa, and an abundance of pure water are to be taken as drinks, but at no time should any amount of liquid be taken with solid food at meals. Few influences operate more harmfully in the production of acid dyspepsia than the common habit of drinking freely at meals. The free use of water an hour before or two hours after meals contributes greatly to the relief of a torpid liver, and flushes out the kidneys in a simple but effective way, not accomplished by other means. It is necessary to prohibit every form of alcoholic stimulant, and no exception can be made to the rule of exclusion. Next to care in diet, systematic out-door exercise and open-air recreation figure in importance; but exercise carried to exhaustion is more harmful than a sedentary life. The administration of nux vomica, bismuth, and soda before meals, and pure pepsin,

with dilute nitro-hydrochloric acid after meals, will, in the majority of cases, prove useful. Perhaps no medicinal agents act more satisfactorily in stimulating the liver than the various saline waters, such as those of Vichy, Ems, Buffalo-Lithia, and Amitou, but the chief benefit derived is from the thorough washing out of the *débris* of oxidation from the system. All mineral waters act best when taken warm and while fasting.

Julius Wesselowski⁷² treats of lithæmia, apropos of a case of a lady who had been pronounced to be a sufferer from Bright's disease. Her pulse was 84, weak and thready; no rise of temperature; skin dry and of yellow hue; a peculiar, distressed look in her eyes. The amount of urine passed the day of the first visit was about one pint ($\frac{1}{2}$ litre). It contained only a trace of albumen, but was excessively charged with uric acid. This led the author to consider the case as one of lithæmia and not of Bright's disease, as before supposed. Under treatment, this patient went on to a fair way of recovery. Her skin assumed a clear appearance, her urine became more abundant, the only trouble remaining being excessive headache at certain times of the day. For this she was treated with acetanilid in 5-grain (0.32 gramme) doses every hour, but, after taking $\frac{1}{2}$ drachm (1.94 grammes) in twelve hours, she became cold, with clammy perspiration, her hands and feet looking blue,—a condition due to the large amount of acetanilid taken. This medicine was withdrawn and her condition became more encouraging. She continued to improve. The main object of treatment in these cases, says Wesselowski, is to keep the bowels regular, attend to the digestion of the patient, giving eliminants to carry off the uric acid, and attend to the general diet, forbidding excessive eating of meats, pastry, and starchy food, but allowing plenty of vegetables. The patients should drink as much water during the day as they can possibly take.

James M. Anders⁷⁰ discourses on the case of a woman, 42 years of age, married, a dressmaker by trade, whose father died of renal dropsy and heart disease, and whose mother is subject to vertigo. She had typhoid fever when 12 years old, and, ten years ago, had acute nephritis after exposure, with œdema of the limbs, lumbar pains, and dark-red urine, scanty in amount. She has been growing progressively obese for the last twenty-five years, and suf-

fers now from oppression, dull pain in the epigastrium and in the lumbar region, with general lassitude and weakness in the knees and with frequent desire to micturate, passing a small amount of reddish, sandy urine. The tongue was moist, with a yellow coating; along the edges and tips it was quite red and the papillæ enlarged—a complete clinical picture of chronic gastric catarrh; the skin was harsh, and dry and scaly over the limbs. Almost immediately after its passage, the urine would deposit urates in abundance and uric-acid crystals.

In these cases, Anders says that there seems to be a lack of energy on the part of the liver. Whether it be functional in all cases, he is not prepared to say; it may be organic. There is a primary condition,—he will not say disease, because it seems to have no pathology, except uric acid in the blood. The condition is very often confounded with certain nervous complaints which, in lithæmia, come and go for months and years, without being apparently any more grave.

In addition to chronic gastritis and nervous conditions, there will also be, in some of these cases, disturbance of the circulation and an early tendency to atheromatous degeneration of the blood-vessels, as manifested by their hardness. In treating these cases, it is necessary to overcome the gastric catarrh and assist the oxidation of the nitrogenous material. The first thing to do is to direct attention to the diet and the mode of living, so as to overcome the digestive troubles. If there is intestinal indigestion, constipation alternating with diarrhœa, all starchy, saccharine, and fatty food should be forbidden; but, if the gastric digestion is at fault, then green vegetables, with fruits and semi-animal food, such as milk and eggs, oysters in moderation, fish and sweet-bread, may be given. Oxidation is assisted by exercise, and the best form of exercise is walking, but never beyond the bounds of fatigue.

Medicinally, nitric acid is useful for stimulating the liver, for assisting to oxidize uric acid, so as to give the acid another molecule of oxygen, converting it into urea. The acid should be given three hours after meals, or an hour and a half before each meal, in 5-minim (0.30 gramme) doses, well diluted with water. No other remedy fulfills these indications with the same efficiency.

DISEASES OF THE BLADDER.

Cystitis.—Audry, ²¹¹_{May 15} treating on the pathogeny of cystitis, reports from Reblaud, amongst other views bearing on the origin of the disease from ferments, that the conveyance of microbes by the general circulation, plays no part in the production of cystitis, in cases where the disease comes on during the decline of the pyrexia. There has been previous nephritis; it is the renal epithelium of the ureter that is altered and leads to the cystitis.

Aimée Morelle, of Brussels, ⁸⁶⁸_{May 7} has examined, from a bacteriological point of view, the urine of seventeen patients, suffering in the urinary passages. The urines were voided spontaneously by the patients and secured in sterilized tubes. He says that the staphylococcus and the streptococcus give rise to the freely purulent cystitis. The urines have often an alkaline reaction, due to the action of these organisms on the urea, transforming it into ammonia carbonate. He agrees with Albarran and Halle, that the bacillus pyogenes is the most important infectious agent in the urinary passages. This organism, however, does not attack the urea; in consequence, it leaves the urine acid, and may be tolerated for a long time without marked general or local action. The bacillus lactis seems to have a wide range of action. It is met with in urine that has been left in a vessel, and in the urine that soaks into the linen of those who suffer from incontinence.

A. B. Clay, ⁷⁴_{Sept.} dealing with the symptoms of cystitis, says that it seldom affects the whole extent of the mucous surface of the bladder. The parts most frequently affected are the neck and fundus, although all parts are liable to become involved. The peritoneal covering is sometimes implicated, but not to any considerable extent. Sometimes the rectum is sympathetically involved, and dysuria is attended with much straining and tenesmus; uneasiness in the epigastric region, with nausea and vomiting. The patient is very restless; shows an anxious expression, and experiences great mental distress from his constant but ineffectual efforts to relieve the bladder. His tongue is dry, covered with a dull, whitish or brownish coat; he has extreme thirst; small, hard, frequent, feeble, and irregular pulse; the urine is scanty, sometimes suppressed; reddish, or tinged with blood; loaded with urates and mucus; turbid and thick. When the

neck of the bladder is mainly affected, excessive pain and a sense of weight and fullness are experienced in the anus and perineum. Acute cystitis runs its course with considerable rapidity; it seldom continues beyond a week or ten days, when it terminates in resolution, gangrene, and suppuration, or assumes a chronic type. If the patient is not relieved in a few days, the system begins to sink; the first symptoms of sinking being cool extremities, tympanitic abdomen, sometimes hiccough, delirium, occasionally followed by coma, uræmia, or convulsions, and the patient is relieved of his misery by death in a week or ten days. In the treatment suggested by Clay, bleeding, in the acute stage, should not, he thinks, be lost sight of. To remove pain Dover's powder is recommended, and to prevent powerful efforts at micturition tincture of apis is indicated. A tea of the *Apis mellifica* (the common honey-bee) is, he thinks, an excellent remedy.

Cantharidine Cystitis.—Lacoste²²⁹ relates the history of four cases of cystitis, produced by the application of cantharidine blisters in cases of pneumonia. The author, in the course of three years, has observed many accidents of this kind, some of which proved of a severe character. The first case was in a young man of strong constitution, 25 years of age, and robust. He was suffering from acute pneumonia of the right lung, and the treatment applied was bleeding, tartar-emetie blister, and emollients. Twelve hours after the application of the blister, the patient experienced intense desire to pass water, but only a few drops of urine tinged with blood could be voided. The bladder increased in size in spite of sedative drinks, narcotics, and emollients applied to the hypogastric region.

In the course of two days, the catheter was obliged to be used three or four times, the mere contact of the elastic sound producing intense pain. Cystitis set in. The pneumonia, which appeared to be getting better, became worse, and the patient succumbed in three days. The next case was that of a man, 60 years of age, rheumatic, and suffering from chronic pneumonia of the right lung. Cystitis declared itself after the application of the blister. Instead of using the catheter, granules of hyoscyamine were prescribed. In the course of two hours, urine was passed,—one granule having been given every quarter of an hour. The patient recovered. The next instance was that of a man of 30,

suffering from pneumonia. Cantharidine cystitis came on under the same circumstances, micturition occurring after the administration of 14 granules of hyoscyamine. A similar result was obtained in the case of a little boy, 7 years of age, suffering from chronic pleurisy of the right side.

As regards the treatment of cantharidal cystitis, Albarran ⁹⁰⁶ _{PL. 12} reports a case, in which, by reason of grave pulmonary lesion, active cantharidal vesication was resorted to. After a short time, active symptoms of vesical irritation were developed, and capsules of the monobromate of camphor were given, without result. Injections of morphine only produced temporary relief. A second application of the vesicant produced a second time the phenomena of cystitis, but injections of morphine gave no more relief than before. Albarran then resorted to the injection of fifteen drops of a solution of cocaine into the bladder. There was immediate relief of the pain, which entirely disappeared.

Nodular Granular Cystitis.—Samuel Alexander, ⁹ _{J.V.}, announced the following conclusions, at a meeting of the American Association for Anthology and Syphilography. The occurrence of nodules upon the mucous membrane of the bladder, as the result of cystitis, is not very uncommon. These nodules are frequently mistaken for tuberculous nodules; they consist of a very vascular, lymphatic tissue, arranged in circumscribed foci, resembling the follicles of the intestinal mucous membrane, but presenting more diffuse masses of cells; the occurrence of these nodules imparts a peculiar character to the clinical aspect of a cystitis, as manifested by pain, hæmorrhage, protracted duration, and a great tendency to relapse; these lymph-nodules are simply the normal lymph-nodules of the bladder enlarged. Nodular and tubercular cystitis may often co-exist, but they are not to be regarded as the results of tuberculous infection.

At the same meeting of the Society, F. Tilden Brown, of New York, read a report of "Unusual Microscopic Bodies Found in the Secretions and Urinary Sediment of a Patient Suffering for Seventeen Years with a Urethral Discharge." He related the history of a case in which a peculiar worm was found in the secretions and urinary sediment. The average length of the worm was one millimetre, being much larger than the ordinary *Filaria sanguinis hominis*; the largest one was three millimetres in length.

The parasite was very difficult to stain. The body was not segmented.

Gonorrhœal Cystitis.—Du Mesnil ⁸¹⁴_{MV} holds that there is no such disease as gonorrhœal cystitis. He states that, when gonococci are present in the urine, they have, in all probability, come from urethral pus, and are not new products of a true specific inflammation of the vesical mucous membrane itself. In women, he says, pus might easily get into the bladder from the urethra or the vagina, and maintains, on the strength of recent researches, that gonococci have no effect on the composition of the urine, and that cystitis with ammoniacal urine is not produced by these bacteria. On the contrary, the urine renders the gonococci harmless, or even kills them entirely.

Treatment.—James Tyson ¹⁰_{Dec. 19, '91} deals with the treatment of acute and chronic cystitis by medical measures. In acute cystitis he prescribes rest in bed as a primary and essential condition; leeches to the perineum should be applied more frequently than they are; a poultice to the same region, and over the abdominal region, is always useful, while a brisk saline cathartic should never be omitted. As the feverish state, which always accompanies cystitis, is more or less constantly associated with the scanty urine concentrated and irritating to the inflamed mucous membrane, it is desirable at once to increase the secretion and thus dilute it. Copious libations of pure water, to which the citrate or acetate of potassium is added in 15- to 20-grain (0.97 to 1.30 grammes) doses for an adult, should be allowed. The ordinary spirits of nitrous ether, in 2-drachm (7.78 grammes) doses every two hours, is a desirable adjuvant, and may be combined with the officinal solution of citrate of potash, which contains 20 grains (1.3 grammes) of potassium citrate to the $\frac{1}{2}$ ounce (15 grammes). Where there is much pain in straining, as is often the case where cantharides is the cause of the inflammation, opium is indispensable (always in the shape of a suppository), $\frac{1}{2}$ grain to 1 grain (0.032 to 0.065 gramme) of the extract being thus administered, or a proportionate amount of morphine. Ice-water injections into the rectum, or pieces of ice similarly applied, are very efficient in allaying the pain and irritation where additional measures are needed.

The successful treatment of chronic cystitis is a more difficult task, for three reasons: (1) the constant presence, in the bladder,

of the urine; (2) the difficulty in getting remedies to reach the inflamed surface; (3) the pent-up inflammatory products which, in their decomposition, often make the urine still more irritating by exciting in it ammoniacal changes. The conditions for cure may be approximated, however, in various degrees: first, the irritating qualities of the urine may be diminished by the use of diluents—best of all, distilled water, from 1 to 2 quarts (litres) of which may be taken daily. If the kidneys are equal to their office, a large quantity of light-colored urine, of low specific gravity and relatively weak in solids, will be secreted. When it is proposed to go further, and add to the efficiency of the diluents, alkalis should be avoided, and the indication should be to render the urine acid, if possible. Benzoic acid has the reputation of doing this, and it probably is true of it when administered in very large doses. It may be given in the shape of a 5-grain (0.32 gramme) compressed pill, of which, at least six must be given in a day to produce any effect. The second indication to medicate the inflamed surface may be done in two ways: (a) by the internal administration of drugs; (b) by the injection of medicated fluids into the bladder. The best internal medicines are the balsams. Sandal-wood-oil is very useful, and is about the only remedy which has direct effect upon the mucous membrane of the bladder. It is comparatively well borne by the stomach, and is best administered in capsules containing 10 minims (0.62 gramme). It is desirable to impregnate the blood and impart to the urine a balsamic odor. The so-called Santal-Midy capsules are better borne than other specimens of the oil. The author has given as many as 12 of these a day for considerable periods of time without deranging the stomach. Boric and benzoic acids are useful adjuvants through their antiseptic effect; each in 5-grain (0.32 gramme) doses, increased to 10-grain (0.65 gramme).

The application of remedies to the bladder by injections, the third indication, comes next under consideration. Tepid water should first be used, the injection being made through the soft catheter, now so invariably adopted. Four ounces (120 grammes) may be injected at a time, and allowed to run out. These simple injections practiced once, or, in severe cases, twice a day, often result most happily; but commonly, after a few injections with plain water, the author adds some medication. His favorite is

sodium salicylate, in the proportion of a drachm to a pint (3.89 grammes to $\frac{1}{2}$ litre) of water. Its disinfecting qualities are undoubted, and it has some soothing effect. Boric acid, in the proportion of a drachm to the pint, is also very satisfactory. Alum is an astringent which has been too much overlooked of late, in suppurating processes in mucous membranes. It may be substituted for the salicylate with advantage, where the pus does not diminish as rapidly as desired. It should be more cautiously used than the salicylate. Sufficient powdered alum should be added to a pint to give a distinctly astringent taste, when the bladder should be washed out as described, and a small quantity may be allowed to remain after the last injection. Where there is a foul odor present, Tyson uses the bichloride of mercury in solution, exceedingly diluted. It is almost incredible how small a proportion of this salt is irritating, and he never begins with a solution stronger than 1-26,000, gradually increasing the strength if it is well borne. Carbolic acid has not been so satisfactory in his hands. He has also used peroxide of hydrogen, 1 part to 5 of water, but the patient, of his own accord, had turned to the bichloride solution previously used. Anodynes are indispensable in many cases of cystitis, to relieve the patient of extreme pain and the frequent desire to pass water. Opium and alkaloids are most efficient, and they are best introduced by the rectum. There appears to be no absorbing power in the bladder for opium. Cocaine, from which so much was expected, has failed in the hands of Tyson. He has injected as much as 2 ounces (60 grammes) of a 2-per-cent. solution into the bladder without effect, except to produce some of the symptoms of cocaine poisoning. Most disappointing, too, has been the use of cocaine to remove the exquisite tenderness of the urethra which sometimes attends this condition, and is a serious drawback to the use of the catheter. Where there is a greatly enlarged prostate, catheterization is indispensable, and is attended often with the most happy results. It is sometimes too long deferred, because of the natural repugnance to the use of the instrument. The patient or his friends should be taught to use the catheter and to wash out the bladder. For antisepticism there is nothing better than the bichloride solution, 1-1000, in which the catheter should be allowed to lie, for a short time, after being cleansed with boiling water.

How much can be accomplished by the treatment just described? That an absolute and total cure is ever obtained, in chronic cystitis, is exceedingly doubtful, but a life of suffering may be converted into one of comparative comfort, and the author has more than once seen a life prolonged half a dozen years in such comfort, by careful attention to the bladder. It occasionally happens that all treatment of this kind fails, and the patient lives to be tortured by the discomfort of the situation. Three times Tyson has had perineal section done by the surgeons, for the relief of such cases, in each with some relief, although with less than was looked for.

In the discussion on Tyson's paper, before the Philadelphia County Medical Society, ¹⁹ Dec. 13, '91 H. A. Slocum spoke of the value of such articles as tomatoes and asparagus as foods, and of boracic acid as an injection. T. S. K. Morton had found the use of salol, in conjunction with milk diet, a good remedy, and had used cocaine with advantage. George E. Shoemaker had found boracic acid, internally administered, of great value. Charles P. Noble used, with much advantage, boracic acid as an injection, but also employed, as an internal remedy, triticum repens with tincture of aconite and belladonna, and with bromide of sodium. In summer-time a pleasant remedy is watermelon, used freely. This is a well-known and powerful diuretic. It gives a bland and unirritating urine, and, in a measure, avoids the necessity for irrigation. Joseph Hoffmann thought benzoate of ammonia the most efficient of all remedies in chronic and acute cystitis. But rest is an important factor in the treatment, and it is absolutely impossible to cure acute cystitis while the patient is going about. Longaker had found 10 grains (0.65 gramme) of benzoate of ammonia most effective, administered internally, four times a day. He preferred to give it with belladonna rather than bromide of potassium.

E. Mansel Symson, ¹⁵ writes strongly in favor of salol in the treatment of chronic cystitis. After all surgical means of relieving the cause of cystitis have been taken, or while they are being carried on, there is a large amount of work left open for more purely medical accomplishment. Given, for instance, that a stone has been removed from the bladder and the retention relieved, the bladder may be in a state of atony, unable to expel its contents, which very rapidly become ammoniacal and purulent.

Great relief can be given by washing out the bladder, several times a day, with a solution of boric acid or other antiseptics, but this is only of temporary service, unless it be done about every hour of the twenty-four. Any drug given by the mouth, which, excreted by the kidneys, would make the urine acid and prevent its fermentation and the formation of pus and mucus, would be of valuable assistance. Sympson, until lately, used benzoate of ammonia, in such cases, and with fair results; but it seemed to do little good in one or two of his cases, and he therefore turned to salol, the advantages of which are striking. Salol is much quicker in its action on the urine, which, within a day or two, loses its foul smell and its alkalinity, and becomes clear, while the bladder seems to regain its power of complete evacuation. And, as salol passes practically unaltered through the stomach, to be split up by the pancreatic juice in the duodenum, it does not disorder the digestion,—a matter of importance, in cases which are frequently attended by nausea and vomiting. Unfortunately, salol is not soluble in water; so that Sympson always gives it in the following manner:—

R Salol., ʒij (7.78 grammes).
Pulv. acaciæ gummi, q. s.
Aq. cinnamomi, ad ʒxij (973 grammes).
Ft. mistura. Signa : ʒss (15 grammes) 4tis horis vel sextis p. r. n.

Arnold takes a similar view to that of Mansel Sympson in regard to salol in cystitis.¹¹⁶ He administers it in gramme (15 grains) doses, and considers that, even in tubercular cystitis, it is of service. It renders the urine clear and acid and may be continued for a long time without injury.

I. Denys and Ph. Sluyts⁵² report on the employment of salol as a means of rendering the urine refractory to the development of the agents of cystitis. They arrive at the conclusion that, with a daily dose of 4 grammes (1 drachm) of salol, taken by the mouth, the urine can be rendered refractory to the development of the streptococcus pyogenes; 5 and 6 grammes (1½ to 1½ drachms) render it refractory to the bacillus lactis aërogenes; 8 grammes (2 drachms) to the staphylococcus pyogenes. The medicamentary doses of salol not only put an end to the development of these producing agents of cystitis, but cause them to perish. The use of this remedy for

urinary infections is, therefore, based upon experimental facts altogether conclusive.

Rommelaere, as reporter of a commission appointed to inquire into the statements presented to the academy by Denys and Sluyts, explains that the members of the commission commenced by examining the effect of salol upon the healthy organism. They consider that there are four pathogenic microbes of purulent cystitis, viz., (1) the bacillus lactis aërogenes; (2) the streptococcus pyogenes; (3) the staphylococcus pyogenes; (4) the bacillus tuberculosis; and they instituted a series of researches of a comparative nature, on the action of salol, at first on healthy urine, then upon salolized urine, keeping note of the dose of salol introduced. They found that the healthy urine constituted a medium favorable to the culture of these microbes, while the salolized urine, on the contrary, placed under the same conditions, arrested the development of the bacillus lactis, and of the streptococcus; the staphylococcus, however, sometimes resisted even when 8 grammes (2 drachms) of salol were taken daily, and the bacillus tuberculosis resisted absolutely. These last facts would suggest a reserve on the too absolute terms of Denys and Sluyts.

Bearing on the mode of treatment of cystitis by injection of silver nitrate, Otis²⁴⁵ expresses the view that, in the early stages of the disease, local measures are not necessary; but he sometimes injects a solution of nitrate of silver into the prostatic urethra, with relief to pain, but with production of frequent micturition. In subacute cystitis he injects a weak solution of silver nitrate, in sufficient quantity to fill the viscus. By this process, inflammatory action in the prostatic region is removed, and a week later the stronger silver solutions may be employed. Otis favors, in some cases, injection of mercury-bichloride solution, and has seen good results from it. In the chronic cystitis of the aged, injections of salicylic acid were found serviceable, and this especially when the urine is charged with mucus. Owing to risk of hæmorrhage, he is not in favor of treatment of the surface of the bladder by the galvano-cautery, under cystoscopic examination.

Shaw⁵³ comments on the use of a strong solution of nitrate of silver in obstinate cases of chronic cystitis of the urinary bladder. He took this idea of treatment from a lecture of T. G. Richardson, who had recognized the absurdity of weak injections twenty years

before, having had some experiments made showing that 100 minims (6.25 grammes) of urine would decompose over 2 grains (0.13 gramme) of the nitrate. He laid down three rules: (1) be sure that you have a genuine case of chronic cystitis; (2) be equally certain that the exciting cause has been removed or modified so as to exert no further influence on the disease; (3) never undertake the method unless the urethra is sufficiently dilated to readily admit a No. 9 or 10 catheter. In making the injection, the bladder is first washed out with tepid water until it comes away clear; then at least an ounce (30 grammes) of a 20-grain (1.30 grammes) solution is thrown into the bladder, preferably by means of an elastic-ball syringe holding 1 or 2 ounces (30 or 60 grammes). If the pain ensuing is very great, the fluid had better be withdrawn in three or four seconds; but, if no severe pain is caused, ten seconds may be allowed to elapse. If no decided improvement takes place within ten days, 30 grains (1.94 grammes) to the ounce (30 grammes) are used; and, no impression having been made by this strength, even 1 drachm (3.89 grammes) to the ounce may be used. It is an old rule in treating cystitis to avoid forcible distension of the bladder. After reporting cases treated in this way, the author wrote to Richardson, communicating to him the good results of the treatment, and received in reply the information that for quite twenty years since he (Richardson) began this plan of treatment, and in no single case had he reason to regret its application. He had never but once been so fortunate as to cure a case by a single injection, his patients usually requiring from three to four applications, beginning with 20 grains (1.30 grammes) to the ounce (30 grammes) and gradually increasing to 40 grains (2.59 grammes), in a few cases to 60 grains (3.89 grammes).

A discussion followed the reading of this report before the Academy of Medicine, at Cincinnati, when, after a debate, in which Gustav Zinke supported the use of nitrate of silver as a good and effectual remedy in skillful and experienced hands, G. B. Orr, Wainig, and Johnson opposed it; Shaw replied that the cases suitable to the method are only those very stubborn cases, with large pus-formations, having a contracted bladder, and that are not excluded by either of Richardson's rules.

C. E. Murphy, ²¹⁷ after describing the internal use of alkaline diuretics and saline purgatives, gives a mode of washing out the

bladder with medicated injections, by means of an instrument devised by Skene, of New York. It is a soft-rubber catheter attached to one end of a piece of rubber tubing by means of a small glass tube, the whole making about two feet. To the other end of the tube there is attached a small glass funnel. The instrument is then complete and ready for use. The catheter should be surgically clean, soft, and flexible, and thoroughly cleansed with a solution of carbolic acid. It should be introduced with great care, and the instillation should be made very slowly, in order not to distend the bladder too rapidly. It is important to ascertain the quantity of fluid the bladder will hold with comfort, and only to use that amount. This amount of fluid may be used several times during one washing. Introduce the catheter into the bladder, lower the funnel, permit the urine to escape, and, still leaving the catheter in place, wash out again by pouring the solution in the funnel elevated, and allowing the contents to flow in slowly. The flow can be regulated by varying the height to which the funnel is raised. It is important not to let air enter the bladder, and this can be prevented by grasping the rubber tubing near the funnel, immediately after the flow has ceased, until the funnel is filled again. For irrigating the bladder we may use: boracic acid, in a 2-per-cent. solution; borax, or table salt, in a 3- or 4-per-cent. solution; chlorate of potash, in a 2-per-cent. solution. After irrigating the bladder thoroughly, the application of astringents and alteratives is most beneficial. The author has used nitrate of silver, sulphate of zinc, acetate of lead, and infusion of hydrastis Canadensis, with marked benefit.

John P. Bryson²⁴⁵ had been accustomed to make use of a 2-per-cent. solution of salicylic acid, in glycerin, as an application to venereal ulcers in patients who had been long under observation. About three years ago, a student, by mistake, mixed 1 ounce (30 grammes) of this solution with 5 ounces (150 grammes) of water, making a $\frac{1}{12}$ -per-cent. solution, for the purpose of washing out the bladder of a patient suffering from chronic exudative cystitis, and who had previously had his bladder irrigated with the standard borax solution, in glycerin and water, without material benefit. Throwing in 1 ounce (30 grammes) of the salicylic-acid solution, the student observed that the returning fluid was much more milky in appearance than the urine previously drained off.

A second ounce was thrown in and returned milky in color, also, before the mistake was discovered, when, becoming alarmed, the bladder was washed out with simple water, and the catheter withdrawn. The patient returned the next afternoon to report that he was much better, and the call to urinate less frequent and less painful, and to ask that a similar injection might be given, which was done. From this time a salicylic-acid solution has been in common use at the Genito-Urinary Clinic of the St. Louis College, in similar cases. The author now makes use of the same solution for injecting the bladder, before using the electro-cystoscope. He also uses it before applying remedies intended as bactericides, or astringents, in order to remove the tenacious coating of mucus on the bladder-surface. It is in the more chronic cases of cystitis, where the surface is covered with a thick or a tenacious coating, made up of mucus and dead epithelium, that irrigation with the salicylic-acid solution serves the best purpose. The addition of boric acid is of no service. The salicylic acid, whose well-known power of dissolving epithelium, or epithelial cells, by dissolving the intermediate cement-substance, here becomes a powerful agent in securing the proper condition for the application of other remedies. The acid is not of equal service in all cases of cystitis, and is distinctly contra-indicated in acute cystitis, with thin exudation. Where ulcers result, with a disposition to bleed, it is harmful. In tubercular disease, where the bacilli and their ptomaines are already breaking down the tissues, without giving opportunity for any other covering to the ulcerations than that afforded by the coagulation necrosis, salicylic acid is not only not needed, but is distinctly harmful. Its use in old prostatic cases, with sacculated bladders, into which numerous trabeculæ project, is open to two serious objections: (1) for the cleansing of the pockets of the tenacious muco-pus, it is insufficient; and (2) the projecting edges of the trabeculæ are unequally exposed to its action, so that frequent irrigations will so soon clear them of their protective coating that they are apt to bleed.

Another useful field for the application of salicylic acid is afforded by the urethra. To irrigate a urethra with, say, a 2½-per-cent. carbolic-acid solution, and then to tie an instrument into the bladder for drainage, or what not, will, in such cases, soon be followed by the appearance of a muco-purulent discharge about the

meatus and around the catheter. To obviate this, the author irrigates the urethra with the salicylic- and boric- acid solutions,—a proceeding which has entirely accomplished the purpose.

Guyon²⁶⁶_{Nov. 11} favors the treatment of cystitis by the use of mercuric bichloride, by irrigation, or by instillation. The strength of the solution may run from 1-5000 to 1-1000. Guyon commences with from 20 to 30 drops from a syringe into the prostatic part of the urethra, increasing the quantity up to 60 drops, the bladder being evacuated after each instillation. This treatment is most favorable, if the cystitis be tuberculous. When gonorrhœal in origin, he instils silver-nitrate solution in the proportion of 1 to 5 per cent. The solution must not be alcoholic; distilled water is the best vehicle. He has had no accident, general or local, from this method of treatment.

Loumeau⁷⁰_{Mar. 25} opposes the treatment of Guyon, and, from the experience of three cases in which the method was tried, concludes that it was a violent treatment. In certain cases, however, it is sound as a remedy, and may be used in solutions of from 1 to 3 parts in 5000. Troquart⁷⁰_{Mar. 25} considers that the sublimate is objectionable for two reasons: (1) that it exposes the patient to the accident of poisoning by mercury; and (2) that it is an irritant, and therefore prejudicial. Lavaux³_{Apr. 27} thinks that, with patients affected with tuberculous cystitis, it is possible to relieve the pain and the irritability of the bladder without recourse to the sublimate. In the great majority of cases, injections of boric acid are sufficient to obtain the desired result.

Reblaud¹⁷_{June 15}, commenting on cystitis among women, says that there are two varieties in puerperal women (puerperal cystitis). One comes after a puerperal infection, is exceptional, and appears to be produced by the staphylococcus pyogenes. The other variety would be better called "post-partum" cystitis, and the affection then may proceed from without, or from the kidney, or more frequently from the lochial discharge. It is favored by the congestive state, lesions of the bladder, and retention of urine. The so-called primitive cystitis of women is often tuberculous, in certain cases seeming to be of renal origin; in others it derives the name of genital cystitis, the microbe proceeding from the vagina and being transported through the urethra into the bladder by leucorrhœal flow.

Loumeau¹⁸⁸ goes largely in the same direction as Guyon, whom he confesses to follow. He shows that, after a single application of the mercurial solution, he obtained, in a case of chronic cystitis arising from a calculus, and of fourteen years' standing, an imperfect success; in a case of chronic tuberculous cystitis of fifteen years' standing, a notable amelioration; in a chronic blennorrhagic cystitis, returning for three years, a complete cure. The sublimate, however, need not be put forward to supplement the nitrate of silver. In the majority of cases the nitrate will be the medicament of choice, and it is with subjects refractory to its action that one ought to have recourse to the bichloride of mercury. It is observable that Loumeau uses stronger doses of the sublimate than Guyon. He goes up to strengths of 1-2000, but this progressively and prudently, commencing at 1-5000.

Wickham¹⁷ supports the use of santal, sandal-wood-oil, in cases of blennorrhagic cystitis. He prefers it to the mode of treatment by injection of solution of nitrate of silver, and it never produces the intestinal disorders observed in patients who are treated with the other balsamics. On the contrary, it has a stimulating action on the mucous membrane of the stomach, which permits of good alimentation. He prefers to administer the santal in the form of capsule. The balsam has a good action upon hæmaturia as well as polyuria attended with pain.

Verhoogen⁸⁶⁸ argues that the treatment of acute blennorrhagic cystitis ought to be dietetic from the first. He considers Guyon's method of instillation of solution of nitrate of silver too severe, although he admits that it may effect an instant cure. He prefers to have recourse to less-violent means. If there be any fever he keeps the patient in bed, and in all cases insists on repose. He recommends the tepid hip-bath, and with this the employment of narcotics, opium or belladonna, by the mouth or in a suppository. He watches carefully for any sign of retention and relieves the bladder at once, if there be such. He commends a milk diet and the avoidance of all irritants. As a rule, the symptoms pass away under this treatment in from three to fifteen days; but, if in any case the disease becomes chronic, he has recourse to local treatment, resorting to injection, not of the sublimate, but of weak solutions of nitrate of silver by the catheter, which he covers with glycerin, rather than vaselin, before introducing it. The glycerin mixes in

solution with the injection. If the cure is not complete after ten of these lavages, he stops the treatment for a time, when the cure often follows, somewhat later.

Ricketts⁵⁸ reports a case of cystitis in a lady, aged 42 years, who had a tedious and protracted labor, followed by puerperal fever, which lasted six weeks. On her recovery from the "puerperal peritonitis," she was annoyed by irritation of the bladder, but did not complain of it for some weeks, when cystitis was discovered. The bladder was then washed out with warm water, followed by warm boracic-acid solution. This was followed again by other remedies, but without effect. There was no gonorrhœal history, and no sign of stone. After a time tincture of belladonna-root was administered, in 5-drop doses, three times daily, and was increased to 28 drops, three and four times daily, before the expiration of eight weeks. The disease did not yield to treatment until these large doses of belladonna, along with daily washing out of the bladder, were resorted to.

Renaud¹⁴ has used oxalic acid for a long time, with satisfactory results. He employs the following formula:—

R. Oxalic acid,	1 gramme (15 grains).
Syrup of orange-peel,	30 grammes (1 ounce).
Distilled water,	120 grammes (4 ounces).
M. Sig.: A tablespoonful every two days.	

Sarcoma of the Bladder.—H. Povall¹⁹² reports a case of sarcoma of the bladder, occurring in a woman 53 years of age. She was "of ample proportion and noble bearing, weighing about one hundred and eighty pounds, of a neuro-lymphatic temperament." In the fall of 1890 she was thrown out of a carriage and fell squarely on her nates. The shock produced concussion of the spine and the abdominal organs, so that, for a short time, she could not move or stand. In a few days she was able to get up; but, as no physician was called, the displacement of uterus and bladder was not discovered until months had elapsed. In the spring of 1891, she had pain over the symphysis pubis, spine, and thighs, with frequent and painful urination, scalding, constipation, and loss of blood. The heart's action was feeble, pulse small and rapid. She was anæmic and much troubled with dyspnoea. To meet the symptoms of hæmaturia and dysuria, intermittent in character, she was treated by the secondary current of

an ordinary electric battery, and afterward by iodine as a counter-irritant over the lower part of the abdomen, and internally by potassium iodide as an alterative; but both remedies had to be abandoned. The microscope revealed in the urine a degenerated tissue from the bladder, mucus, pus- and blood- cells. A notable feature of the case was the clearness of the urine when it began to flow. The capacity of the bladder was very much diminished and its elastic character greatly reduced. Four ounces (120 grammes) of fluid, used as a douche, occasioned distress from distension. Death occurred in January, 1892, in a semi-comatose condition. The author diagnosed, in this case, sarcomatous tumor of the bladder, arising from constitutional diathesis (?) From maidenhood, evidence existed of the presence of a scrofulous condition, with a malignant growth on her cheek, followed by an intractable skin disease, which was the bane of her life. Menstruation had ceased some three years previous to her accident, and doubtless this periodical function had been a safety-valve in her constitution. The author questions whether this was a suitable case for operation, and whether her life would have been saved by an operation. Since the publication of Symon's cases, the removal of vesical tumors in females, through the dilated urethra, has been regarded amongst surgical possibilities. Steine publishes 23 cases, of which 13 recovered, 2 were improved, and 8 died. In this case Povall thinks that excision would not have prevented the progress of the disease, but rather have hastened the fatal issue.

HÆMATURIA.

During the year 1892 considerable additions have been made on the subject of hæmaturia, and especially in regard to hæmaturia of a malarial origin. The literature of Italy, France, and Spain contributes its part; but, by far, the largest and most practical is to be found in the English and American contributions.

Frederick Robbins¹⁸⁵ contributes a paper, read before the Detroit Medical and Library Association, in which he contends that, in most cases where the blood comes from the genito-urinary tract, the fact that we have blood present is readily appreciated; but there are some cases in which one is likely to be mistaken. Wherever blood is suspected, the first thing to do is to make a careful microscopic examination of the urine in order to ascertain

if blood-corpuscles are present, as they are in all cases where blood has its entrance into the urinary tract below the kidneys. If blood be present in a bladder containing alkaline urine, many of the blood-corpuscles will have been destroyed, but many corpuscles will be still intact. If we have hæmaturia and no corpuscles are found, the kidneys are to be considered the home of the disease, and we should look very carefully for blood- and other casts. This condition—whether due to nephritis or primarily to some general disease, as malaria, yellow fever, cholera, scurvy, eruptive fevers, or other blood diseases—he believes to be brought about by congestion or inflammation of the kidney. When no corpuscles are present in the urine, which appears to be colored by blood, we have to decide whether this appearance is due to urophæin, the coloring matter of plants, or to hæmoglobin. If a quantity of dark, granular matter be present, we have a right to the thought that this is the remains of broken-down blood-cells, and that their coloring matter is free in solution. The reaction of urine containing these coloring matters is usually alkaline; and whether the patient has partaken of rhubarb, senna, or santonin, or is suffering from some grave dyscrasia, is determined by adding to the alkaline urine a small portion of HNO_3 . The phosphatic deposit is dissolved and the coloring matters of vegetable origin are changed to a yellow, and the urine is clear. If the HNO_3 be carefully added to urine colored by blood, the phosphates disappear, but their place is taken by a ring of albumen and the coloring matters remain. In urine colored by blood the color is usually a brownish red, but in some cases the red shade has disappeared and we have a dirty-brown appearance, seen in cases of carbolic-acid poisoning. From these urines, if hæmatin crystals can be formed, we have a sure proof of blood; and the method of Teichmann is simply for determining this point. A drop of urinary sediment is allowed to dry on an object-glass; then a few particles of table-salt are thoroughly mixed with it; over the mixture a cover-glass is placed and a few drops of glacial acetic acid are allowed to pass under the cover, the whole being gently warmed. When the fluid is seen to be nearly evaporated, a little is placed under the microscope and the hæmatin crystals are seen forming.

After the presence of blood has been actually determined, it is necessary, if possible, to detect the seat of the hæmorrhage. In

some cases we can see the blood flowing from the meatus, or, by passing a finger along the urethra, from the bulb forward, can press out a small portion of blood. In such cases there is no doubt that the anterior urethra is the seat of trouble, which is due to acute inflammation, as we see in gonorrhœa, when the pus is mixed with blood, or to direct injury of the urethra in other ways. If pain in the perineum, or at the end of the penis, be felt, with frequent desire to urinate, and with passage of blood, we have good reason to believe that the posterior urethra, and not the bladder, is the point sought for. If we are not sure about this, it is well to place the patient in bed, pass into the bladder a soft catheter, and through this wash out the bladder over and over again, until the water returns perfectly clear. Now plug the catheter, and allow it to remain in place for a couple of hours. The pressure of the catheter will probably check all bleeding from the urethra, and, upon removal of the plug, clear urine will flow out. This makes the diagnosis complete. Blood-clots do not come from the kidney, and, therefore, when present, come from the bladder, ureter, or hilus of the kidney. If the latter, pain is produced by their passing along the course of the ureter, and is one of the most important points in diagnosis. Occasionally we are able to find vermiform clots, which are casts of the ureter, and, therefore, are diagnostic. Clots formed in the urethra are formed without pain, and are rare; for, to produce clots, the bleeding must be very severe, or the bladder be free from urine, for clots will not form if the proportion of water be greater than that of blood. To determine, by any method, whether the blood comes from the bladder, pass in a metal catheter with a large eye and wash out the bladder until the water comes out perfectly clear; then withdraw the syringe, turn the catheter carefully and systematically, until you have irritated the entire bladder-wall, and, if there be a vulnerable spot present, bleeding will probably be the result of the manipulation. Another method, called the absorption method, is of value. The undenuded surface of the bladder will not absorb iodine or other foreign substances. In cases of retention of urine we do not get uræmia, for instance; but if the bladder is denuded of its epithelium, and if, after washing the bladder, we inject 15 grains (1 gramme) of potassium iodide and in fifteen minutes mix the sputum with a preparation of starch, the characteristic réaction of iodine

on starch will take place, and we may be positive that the bladder-wall is in an unhealthy state. One frequent cause of bloody urine is the too rapid evacuation of an overdistended bladder, a vacuum being formed and a general capillary hæmorrhage resulting. To avoid this, it will be found safe either to introduce a sound, after which the patient will usually pass water himself, or empty the bladder by means of a very small catheter.

When hæmorrhage is caused by stone in the bladder, we usually have symptoms which lead us to a search that will clear up the diagnosis. In patients of low vitality it is sometimes impossible to determine whether a cancerous or other tumor be present, or whether there has been an ulcerative process going on; but, even here, the microscope may reveal the presence of organic elements—epithelial or cancerous cells—that will make us quite positive. Again, foreign bodies are occasionally found in the bladder, introduced from without. Lannois ²¹¹_{Dec. 20, '71} dwells at length on the case of a man in whom hæmaturia came on from walking or other muscular fatigue. The symptoms began at 9 years of age, and then subsided, recurring in later life on going to a gymnastic school, and continuing always when the body was subjected to exercise, without any assignable lesion of the bladder, ureter, or kidney.

Quinine and Hæmaturia.—H. A. Hare ⁸⁰_{July} endeavors to solve the question whether the hæmaturia occurring during malarial fever is, as above stated, a result of the quinine used in the treatment. He has entered largely into correspondence with medical men in malarial districts. Nineteen of his correspondents considered quinine useful, 12 considering that it cured hæmaturia. On the other hand, 28 thought quinine was harmful and 27 believed that it was the cause of hæmaturia. Hare considers that there are differing conditions under which hæmaturia appears during malarial fever, and that confusion has arisen from mixing up different classes of cases. He believes, however, that there is no doubt that quinine may be injurious, acting as an irritant to the genito-urinary tract, and, in full doses, causing congestion of this tract; and he would therefore recommend that, if hæmaturia comes on at an early stage of treatment, it is best to refrain from using quinine. At the same time, in very severe cases, it may be prudent to arrest the effect of the malaria at any cost; but in all

such cases the use of the quinine should be followed by free purgation, and, in prolonged cases, it may be withheld in favor of other modes of treatment. He does not doubt that malarious disease predisposes some patients to hæmaturia as the result of taking quinine. He concludes that, in mild forms of malarial disease, quinine should be withheld if hæmaturia presents itself, but that it is useful in extreme cases where there are symptoms more serious than hæmaturia itself. In some acute malarial diseases it should be given in moderate doses, combined with a careful regimen.

W. P. Barton⁷⁴ discusses the subject of malaria hæmaturia, under the title of the old and new theory. He defines the disease as dependent upon a pathological condition, and considers that, whether acute or chronic, it is due to a malarial germ, but that the disease is only indirectly dependent on this, and owes its existence more to a secondary condition produced by the development of the germ; a condition which involves the whole system and not special organs, as many partial observers think. Barton believes that the malarial germ finds its nidus in the red corpuscle of the blood, and not only makes this little body its home, but its food also. All, he thinks, are agreed thus far, but in regard to the exciting cause of the disease there is an old and new theory. The old theory is, that the hæmaturia is the direct product of a nervous explosion; the new, that it is due to the administration of quinine. In his (Barton's) practice, in a series of sixty consecutive cases, not one presents a variation from the quinine history. The mode of death is determined by uræmia. He infers, therefore, that quinine is contra-indicated. Opium is contra-indicated. The *rationale* of treatment is, that turpentine must be used as a healing diuretic, and that the bowels must be kept open by salines.

The question whether negroes suffer from malarial hæmaturia is one in which there is difference of opinion. Bruce McVey,¹² a supporter of the quinine treatment, observes, on a statement of Martin, that negroes in his part of the country have lysæmia; that he himself has made a careful research and has never found a well-authenticated case in his vicinity. He quotes, also, Canfield, Hale, and Sole, of Texas, to the same effect. E. H. Parham¹¹⁷ sustains the view that quinine is injurious in malarial hæmaturia, and must always be used with the greatest watchfulness. He is answered¹¹⁷

by another practitioner, who argues that quinine can only be regarded as a poison to the malarial organism, and that, although it sometimes fails, it is rather from mismanagement or administration in too large doses. H. E. Williams, speaking of malarial hæmoglobinuria, says that there are conditions which will not admit of the use of quinine, and that in large doses it prevents the elimination of urea. He does not think a patient has one chance in a thousand to recover, if under the care of a physician who prescribes quinine freely. He himself uses eliminative treatment—calomel and ipecac, with antipyrin as an antiseptic, and with sulphite of soda on account of its antizymotic qualities. He never presses the kidneys to work unless they begin to suspend action; then he gives digitalis with nitrate of potash, and he makes no effort to check the so-called hæmorrhage, which he considers a means of relief.

E. H. Martin,¹² notices a plan of treatment of malarial hæmaturia or lysæmia, introduced by S. Williams, of Mount Meigs, Ala., so simple and so directly at variance with orthodox teaching that it requires some courage to follow it in the first case. Martin has found this treatment as infallible as Williams promised; and, after a series of cases brought speedily from conditions of helplessness, at times with suppression of urine and grave uræmic symptoms, to rapid and complete convalescence. It is rare for him, now, to feel any anxiety concerning the most severe cases.

Malarial hæmaturia occurs only in persons who are suffering from chronic malarial poisoning. They may, or may not, have had frequent attacks of malarial disease, but they have always been exposed to the action of the poison for some length of time; the blood has become deteriorated, and a tendency to dissolution and disintegration of the red corpuscles has taken place. The long-continued state of malnutrition has so weakened the walls of the capillaries that they are easily ruptured, the slightest wound producing a bruise and allowing transudation of serum. As a third factor, a local increase of blood-pressure in any part or organ will produce an outpouring of blood-coloring matter, which rapidly stains the skin an intense yellow,—a jaundice without bile. The toxic agents set free by this process, or retained by the disordered secretions, soon cause an uncontrollable vomiting and incessant nausea; at times delirium; always a relatively slow pulse, until just before the end; a generally slight rise of temperature, after the sweating

stage of the final malarial attack ; and, finally, after the kidneys are choked by disintegrated corpuscles, a suppression of urine, which, if not speedily relieved, is followed by coma and death. All this may occur in less than twenty-four hours from the beginning of the attack, or it may take days.

It is evident that the first two essential conditions—those of the blood and capillaries—arise from malarial toxæmia. The third factor—the localized increase of blood-pressure—is chiefly from congestion of the internal organs incident to a chill, and almost always directed to the kidneys by the increased work these organs are performing in eliminating the quinine which has been given to abort that chill. The author has never seen a case in which the affected person has not been more or less cinchonized at the time of the attack, and, judging from the bad effect of this drug when administered after disease is established, it is but natural to suppose that in most cases it is more or less an exciting cause of the disease; not always, for McVey asserts that he has never seen cases where quinine had not been taken for a year previously. But, leaving out the quinine factor, the three essentials before mentioned are sufficient to explain the occurrence of the disease, and this without the theory of any special germ. Malarial hæmaturia is not a disease *per se*, but a morbid condition resulting from a specific disease—a condition for which the author has suggested the name lysæmia ; and as this morbid condition is more serious than the causative disease, it is evident that the treatment should be directed first to the correction of the condition. The methods of treatment, in the order of their importance, are: (1) to clear up the urine; (2) to evacuate the bowels, and keep them acting, that they may aid in freeing the system from the toxic agents set free by the explosion, and better the state of the system for absorption of remedies and nourishment; (3) to repair the damage done to blood and blood-vessels; (4) to administer any antimalarial remedy which will not interfere with carrying out the other indications. The clearing of the urine is first in order of importance, and the one remedy *par excellence* is turpentine. To an adult 10 drops every four hours never fails to clear up the urine in from 12 to 48 hours. Improvement generally begins as soon as the odor of violets is noticeable in the urine. The turpentine, in the author's opinion, acts not directly as a hæmostatic, but as a

reparative to the capillaries, and as a dietetic. He objects altogether to ergot or gallic acid, for the reasons that they can have but little effect, and, if they have, it is a bad effect, as they have no dietetic action. Digitalis he does not think is ever needed, as the circulation is always oppressed. The second indication is accomplished by means of any purgative at hand. Calomel has no specific action. He gives it in moderate doses in the beginning of the attack, where vomiting is severe, but he prefers Epsom salts, and, as routine treatment, prescribes a tablespoonful every four hours, until six or more actions have been produced on the bowels. The third indication is nourishment and iron—the iron preferably in the form of the tincture of the perchloride. In a vitiated state of the stomach, he does not believe that any other preparation of iron compares in utility with the old-fashioned tincture. He generally gives a little nourishment, followed by from 4 to 6 drops of the tincture, well diluted, every four hours. The most useful article of diet, in the largest number of cases under his care, has been butter-milk. The fourth, or antimalarial indication, he prefers to meet with arsenic in the form of Fowler's solution. It is palatable, and readily retained. Quinine he never gives, but invariably stops its use when he finds it is being employed.

George G. Petty, in an article on the same subject,⁷⁴ gives a somewhat different opinion from that of Martin. He says his experience has confirmed him in the view that there are cases of malarial hæmaturia that occur independently of the action of quinine; while he admits that the great majority of cases met with in practice are the product of quinine, which has been administered to a person suffering from chronic malarial poison, without first arousing the action of the excreting glands. He believes the pathology of the disease to be like that of the vasomotor nerves supplying the capillary network of the kidneys, thus allowing dilatation of the capillaries within the Malpighian corpuscles to such an extent that the red blood-corpuscles, and other products ordinarily retained, pass through their attenuated walls and appear in the urine. He also thinks that this vasomotor paralysis is the only difference between the manifestations of chronic malarial poisoning attended by hæmaturia and those unattended by it. There should be a marked distinction made between cases of pernicious malarial fever, in which hæmaturia occurs as a result of

the deteriorated state of the blood and a depressing influence of the malarial poison on the vital forces, and those cases in which quinine plays the part of an exciting cause. When the disease occurs independently of the action of quinine, it is due to the overflowing influence of the malarial poison on the sympathetic nerves, and when the system is so saturated with the poison that *its influence alone* brings about this vasomotor paralysis and attendant hæmaturia. Such cases, one would suppose, would be of a much graver type and less amenable to treatment than those cases which only occur after the addition of an exciting cause, as quinine. He does not find it difficult to understand how quinine brings about the hæmaturia. Quinine is eliminated principally by the kidneys, but by all the other eliminating glands as well, and if it be administered to a person suffering from malarial poison when all the excreting glands—but especially those of the skin and intestinal canal—are inactive, the kidney, being the only excreting organ that it will materially affect, at once takes on the active work of elimination, necessitating a large supply of blood to itself; and if during this process a chill comes on, accompanied, as it always is, by increased determination of blood to the large internal organs, the vasomotor supply of the capillaries of the kidneys, being unequal to the task of maintaining their normal tone, are overpowered, and hæmorrhage with the urine is the result.

Hæmorrhagic urine can be produced at will, in a large class of persons saturated with malaria, by giving quinine freely, from two to four hours before the return of the chill. It was a frequent observation of this state of affairs that led the author to conclude that hæmorrhagic urine, in these cases, was due entirely to vasomotor paralysis. The lines of treatment suggested, taken from the stand-points named, are: 1. Open the flood-gates and wash out the accumulated waste; promote and maintain free secretion. 2. Arouse and support the overpowered nervous system, especially the vasomotor. 3. Control the temperature. 4. Treat the specific malarial paroxysms, if they occur; if not, then the general malarial conditions. For the first indication nothing serves so well as a full dose of calomel, followed by frequently-repeated small portions; and if these do not keep up a sufficient purgative action, sulphate of soda or Epsom salts serve excellently. Strychnine, hypodermatically administered, meets the second indication

perfectly, but it should be supplemented with digitalis, which meets, also, the third indication. For the fourth, quinine may be given, with the utmost freedom, after the secretions have been aroused, and it will not cause a return of the hæmorrhage while the patient is kept fairly under the influence of digitalis and strychnine. The author considers this an important clinical fact, and believes that it will stand the most critical test.

Malarial Hæmoglobinuria.—A somewhat different view, in regard to the action of quinine, is given by Bastianelli and Big-nami,⁵⁶⁹ who refer to four cases of malarial hæmoglobinuria, in which they examined the blood of the patients. In two of them the blood showed many malarial parasites, in different stages of development. Quinine was administered, with the result that the hæmorrhagic symptoms, which had lasted for twenty-one hours, in one instance, were arrested. The parasites, also, ceased to appear in the blood. In another case the hæmorrhagic symptoms appeared on the fourth day of a recurrence, and lasted thirty-six hours. In this instance quinine was administered, and with equally good effect. In the third example the hæmoglobinuria extended over twenty-four hours. In this case no parasitic developments were found in the blood, although there was a fever of three days' duration. Quinine was not administered.

The author draws the inference that hæmoglobinuria occurs at periods of an æstivo-autumnal type, from the circumstance that the destruction of red blood-corpuscles is more extensive than in malarial seasons during spring.

Methæmoglobinuria.—Lockhart Gillespie,⁵⁷⁰ after recording a case, adds that this is a local disease, and yet a general one. The breaking down of the red corpuscles and consequent setting free of hæmoglobin occurs in the blood. In ordinary cases of Bright's disease the serum-albumen is in excess. Excess of globulin over albumen in the urine is said to be due to increased blood-pressure. Red blood-corpuscles are now formed in great numbers, to make up for the deficiency caused by the previous destruction; and if the observation that the spleen enlarges after the attacks is confirmed, it is good evidence that the manufacture of the young cells takes place there. The variation of the size of the red corpuscles in Gillespie's case was very instructive. After the second attack the corpuscles varied from 4 to 7 μ on the day after, and on the

next day from 2 to 3 μ and from 6 to 9 μ . After the third attack, the sizes were from 2.5 to 9 μ . At the end of the considerable period that elapsed between the first and the second attack, the red corpuscles measured from 7 to 10 μ , or about the normal.

Gillespie tested the acidity of the urine each time, but with no result, save that, as the urea increased, so did the acid. Bearing in mind, however, the inverse proportion which always maintains between the acid eliminated by the kidneys and that present in the gastric juice, there is presumably a deficiency of acid in the stomach contents during and for some hours after an attack.

Hæmoglobinuria.—David Streett⁷⁶⁰_{Dec. 24, '91} observed that some cases which are put down as malaria are, doubtless, cases of hæmoglobinuria. He was led to look up this subject by seeing a specimen of urine that was characteristic of this disease red and bloody-looking, but on finding no red corpuscles his interest was awakened. About six years ago, Jacobi, of New York, wrote a paper in which he reported the destructive influence on the red blood-cells of chlorate of potash, given in large doses in diphtheria, producing hæmoglobinæmia, thus causing hæmoglobinuria. He has been cautious of the use of chlorate of potash since that time.

CHYLURIA.

Francis Delafield describes the case of a young man, 26 years old, who was well until four days before admission into the hospital (Vanderbilt Clinic, New York), when he noticed that he was passing white urine in the morning. He had a similar attack, in Santa Cruz, in 1890. The urine had a specific gravity of 1026, contained albumen and a few pus-cells. Delafield says the disease is not common in New York. When it is seen there, it is in persons who come from other countries, usually from the tropics. The most common symptom is the chyluria,—*i.e.*, the passage of urine which looks white, its color being due to the fat which it contains in the form of globules. Except for this change in the urine, there may be no other symptom; or there may be a loss of flesh and strength. In addition, there may be enlargement of the lymphatic glands and hyperæmia of the skin in different parts of the body. The essential feature of the disease is the presence in the blood of the filaria of an animal parasite (*Filaria sanguinis hominis*),—little thread-like worms circulating in the blood, and

found usually on examining the blood during the night. There is no known way of curing this disease; but many of the cases get well of themselves, the parasites apparently ceasing to live after a certain length of time, when the symptoms disappear.

Hisao Sewaki²⁰⁰ relates the case of a farmer, admitted into the Tokyo Hospital on September 9, 1891, passing urine tinged with blood. His father had died of apoplexy, his mother of rheumatism (?), and a sister died also of apoplexy. He had small-pox and measles when a boy; and nine years ago, after frequent bathing in a hot spring, had noticed that his urine, for a time, showed evidences of blood. His present illness commenced in the beginning of August, 1891. On admission to the hospital, microscopical examination of the blood revealed an abundance of cut pieces of *Filaria sanguinis hominis*. He passed bloody urine seven or eight times a day. It was of weak alkaline reaction, had a specific gravity of 1015, and presented a pinkish appearance, owing to the presence of blood; it also contained albumen in large amount, and a few pieces of filariæ were found. The tongue was slightly coated, the appetite good, the bowels open once a day. On September 12th, he passed 20 ounces (600 grammes) of urine in thirteen hours, and filariæ were found in it. On the 13th, the bladder was washed out with a solution of 1½ grains (0.097 gramme) of perchloride of iron to the ounce (30 grammes) of water; and this was continued until September 28th, when he was discharged from the hospital, and two months and a half afterward was in the enjoyment of very good health and quite free from any discoloration of urine.

PEPTONURIA.

Paul Chéron¹⁷ summarizes various opinions respecting peptonuria. Köttnitz noted the almost constant presence of peptone in the urine of a woman of 38 years, affected with splenic leukæmia. Lussano, Félice, and Conte have discovered peptone in the urine of anæmic persons. Paeanowski found peptone in the urine of almost all infectious diseases except measles. Köttnitz, on the other hand, did find it in that disease. The destruction and re-absorption of albuminoidal substances, in infectious diseases, explains the appearance of the peptonuria. Marro found peptones in the urine of general paralysis, and, in doubtful cases, the absence of peptone would discard the idea of general paralysis.

Maccahuni investigated peptonuria amongst the insane. Amongst the quiet cases the urine presented no peptone, and the form of mental disease exercised no influence; but amongst those who were agitated peptonuria was met with, though rarely. Peptonuria often coincides with fever, but that is not an indispensable condition. In intermittent states it is most common at the acme and at the decline. Peptonuria is absent in pellagra, epilepsy, and hysteria. P. Raymond groups peptonuria under the following heads: 1. With excess of white globules and their destruction, and under absorption of pus in purulent pleurisy, pneumonia, and empyema; and under acute rheumatism. 2. When there is destruction of normal leucocytes of blood, as in scurvy, phosphorus poisoning, and infectious disease. 3. When the peptones form in the blood in too great quantity, and the white corpuscles allow them to escape; and in malignant tumors. 4. When the peptones cannot be transformed into albumens, assimilable in traversing the surface of the intestines, as in affections of the stomach and in ulcerations of the intestinal canal. Peptonuria may occur in the obese and in those affected with albuminuria. It may, under certain circumstances, be useful for diagnosis, as in case of ovarian cyst, and in distinguishing cerebro-spinal meningitis from tubercular meningitis. Peptone in the urine may also be useful in prognosis in certain cases; as, for example, in pneumonia, where it shows itself immediately before the defervescence. In typhoid and scarlet fever it is one of the first signs of convalescence. When the peptone shows itself in diabetes, it is an indication of loss of azote, which, as well as loss of excess of urea, announces a grave period.

The albuminoids or propeptones are intermediate between syntonin and peptone. They form during the digestion of albuminoid matters by the gastric or the pancreatic juice. The general qualities of the propeptones are: they are precipitated by heat and are generally soluble in alcohol, cold or warm. The greater part are precipitated by sulphate of magnesia and sea-salt in excess. Pure alcohol precipitates them with coagulation and without rendering them soluble. When cold they are precipitated by nitric acid, the precipitate redissolving when the fluid is warmed. Propeptones give the biuret reaction. When urine contains neither albumen nor globulin, and, when boiled, forms a precipitate on cooling, propeptone may be considered present. Garnier and Schlag-

denhauffen recommend the reaction of acetic acid and of yellow cyanide. This yields a slight precipitate in urine of medium concentration if it contains 0.5 of propeptone. The precipitate is dissolved by heat and re-appears on cooling,—a feature which distinguishes it from albumen.

URIC ACID AND THE URIC-ACID DIATHESIS.

Sir Wm. Roberts²¹⁰⁰ has done original work on this subject, especially on the chemical etiology of uric-acid gravel. Putting aside, for the moment, remote and predisposing causes of gravel, he observes that no amount of morbid proclivity can take effect if the urine be alkaline, nor if the proportion of uric acid in it fall below a certain point. He points out that the salines and pigments of the urine exercise a protective influence against premature precipitation of uric acid, and it may be hence inferred that diminution of these salines and pigments may sometimes act in a negative manner as a deterring factor on the production of gravel and stone. Touching the effect of the poverty of urine in saline matters, he contends that this is probably an influential factor in the disproportionate frequency of stone among the children of the poor, as compared with those of the easier classes. The children of the poor are fed largely on farinaceous articles; the natives of India on rice; hence, possibly, the frequency of stone amongst them. On the other hand, those who take very large quantities of common salt with their food, experience a practical immunity from stone. Speaking of the immediate determining causes of uric-acid gravel, the author says that, in the vast majority of cases, the immediate determining cause is excessive acidity of the urine, and that the paramount indication of preventive treatment is to diminish the acidity. All other schemes of treatment sink into insignificance in comparison with this. The use of alkalizing agents for the prevention of uric acid stands on a perfectly rational basis. It is chemically impossible for uric acid to be deposited from an alkaline urine, and it may even be said that it is impossible for uric acid to be deposited within the ordinary channels from a neutral or feebly acid urine. Another observation of much practical value is, that the natural oscillations of the urine, at different periods of the day and night, lead to the inference that the liability to uric-acid gravel rises to a dangerous intensity only during certain limited portions

of the twenty-four hours. The risk in gravel is almost confined to precipitations from *renal* as distinct from *vesical* urine, which latter represents the aggregate work of the kidneys during several consecutive hours.

ACETONURIA.

S. Boeri⁵⁸⁶,²_{Nov., '91, June 18} draws our attention to the following deductions, derived from observations on the human subject and on the lower animals: 1. He admits the occurrence of a physiological acetonuria in man, as well as in dogs and rabbits; acetone being present, however, only in minute quantities. Acetonuria cannot, therefore, be regarded as of any importance, unless it greatly exceeds the physiological limits (12 to 15 milligrammes). 2. An experimental acetonuria can be produced by any means which are capable of causing destruction of the blood-elements. This result is probably due to the diminution of the oxygen contained in the blood, and, therefore, in the tissues. The same explanation has been advanced by Albertoni and others, to account for the increased elimination by the kidneys of substances like acetone, produced in conditions of auto-intoxication. 3. These observations on animals throw much light on the production of acetone in febrile conditions, which are accompanied, as pointed out by the author, by destruction of corpuscles or of albuminous elements of the tissues. 4. Acetonuria of intestinal origin cannot be denied, but its occurrence from this cause is probably much more rare than many have imagined. 5. Reduction of the alkalinity of the blood has not such an important bearing on the causation of acetonuria as is thought by some, for the author points out that the phenomenon is physiological in the herbivora, and that a pure vegetable diet has no appreciable diminishing effect in acetonæmia or in the acetonuria accompanying diabetes. In fact, a diminished alkalinity of the blood and the presence in it of acetone should be considered not as cause and effect, but rather as common results of a process of auto-intoxication.

URINALYSIS.

Centrifugal Analyses.—Thos. Stenbeck¹¹⁴_{7, '20} describes a centrifugal method of his own. Tubes containing urine are so arranged that they can be revolved in a horizontal position, by means of a multiplying wheel with a precipitating force fifteen hundred times

greater than gravity. Each tube contains 12 cubic centimetres ($3\frac{1}{2}$ drachms) of urine, and is provided with a small reservoir at the bottom, which prevents the sediment from mixing with the urine. The advantages claimed for the apparatus are that by it precipitates can be obtained in minutes that before required hours.

Albu_{uv}⁴ speaks well of this method, after using it in the examination of a large number of specimens of hospital urines. A greater quantity of deposit is obtained in this manner, although the quality in regard to substances detectable in the deposit is not increased. Broad cells were sometimes found, leucocytes, casts, pigments, and, in two cases, tubercle bacilli.

Ochronosis.—Hansemann relates an instance⁴ of Bright's disease in which, before death, the urine was of almost black color, containing albumen and casts. At the post-mortem, pigmentation of the cartilages was discovered; the tendons showed dark stripes on section, and microscopical examination indicated a diffuse and granular pigmentation. The diffuse pigmentation was found in the hyaline and the reticulated cartilages and tendons; the granular in other parts, as well as in the urine. The author believes there is no difference, chemically, between the two pigments.

Electrical Examination of Urine.—Dawson Turner² describes a method of electro-diagnosis of urine. The urine is placed in a V-shaped tube connected with a measuring bridge. The electrical resistance of various artificial fluids were first determined. Thus, a 3-per-cent. solution of urea gave a specific resistance of 382.5 ohms; a 2-per-cent. solution a resistance of 569.5 ohms; a 2-per-cent. solution of sodium chloride gave a specific resistance of 29.25 ohms; 1-per-cent. gave 59.5 ohms; 0.75 per cent.=79.9; 0.5 per cent.=110.5. A 2-per-cent. solution of sodium chloride, mixed with a 20-per-cent. solution of grape-sugar, gave a specific resistance of 51 ohms. The specific resistance of distilled water was stated to be infinite, that of ordinary spring-water enormous. The resistance in urines was stated to depend mainly on the presence of chlorides, but possibly, also, on the sulphates, and, it might be, on other salts. It was argued that the method was a much more convenient and accurate means, for example, of determining the amount of urea than was the ordinary mode, and it was illustrated by referring to a case of pernicious anæmia, where the urine had a specific gravity of 1017

and 9.36 grains (0.60 gramme) urea per ounce (30 grammes) on one day, and specific gravity 1020 and 7.02 grains (0.45 gramme) urea per ounce on another. From this nothing definite could be deduced, whereas much could be learned when you were told that the specific resistance in the one case was 68 and in the other 51 ohms.

Chromic Acid in Testing for Albumen.—O. Rosenbach ⁶⁴_{July} states that a 5-per-cent. solution of chromic acid will detect very small quantities of albumen and biliary pigments in the urine. It is only necessary to add a few drops of such a solution to the suspected urine previously slightly acidified. If albumen be present a flocculent precipitate is rapidly formed, which is rendered more apparent by its yellow color. This cannot be confounded with phosphates and urates, as the chromic acid forms no precipitate with these salts. If biliary pigments be present, the same chromic solution, added drop by drop, with agitation, will cause a beautiful green coloration, which becomes more and more intense, and afterward changes to a reddish brown.

Diagnostic Value of Tube-Casts.—I. N. Danforth ²⁵⁷_{Sept} classifies tube-casts of the urine as follows: 1. Mucin-casts: (a) simple mucin-casts, entirely destitute of formative elements; (b) mixed mucin-casts, or those including crystalline or cellular elements, acquired during their formation in the tube. 2. Fibrinous casts: (a) hyaline or structureless casts; (b) blood-bearing casts; (c) cell-bearing casts; (d) fatty casts. The mucin-cast is the product of a catarrhal nephritis, as distinguished from exudative, and is the characteristic morphological product of this disease, frequently the only reliable indication of its existence. Fatty casts are evidences of the completion of the destructive process, of which the hyaline cast marks the beginning. They are more or less twisted as the tubule is more or less pulled out of shape by the encroachments of the pathologic connective tissue; thus, they indicate the stage as well as the type of the disease of which they are the product.

Urinalysis in Life-Assurance.—Marvin L. Graves ⁴⁰_{July} treats at length on this subject. After dealing with the color and the solids of urine, he considers the presence of albumen, sugar, peptones, inorganic and organic deposits,—blood, mucus, pus, casts,—dealing with their relative importance. He makes a point of the study of peptones in the analysis of urine for insurance, because, although no company as yet mentions peptonuria in its inquiries, he believes

that the significance of the subject will yet be realized. Peptone is a congener and closely related to albumen, being a derivative through the digestive process of the organic nitrogenized foods or class of albuminoids. They are not precipitated by heat or HNO_3 , but by HgCl_2 , tannin, and sodium tungstate; but this may be redissolved by heat. Peptones are a constant constituent of pus. The author holds that serum-albumen in urine—neither functional nor diathetic, nor the result of cystitis—condemns a case for insurance.

Acetone in Urine.—Jas. Tyson¹¹² treats on acetone and diacetic acid in relation to their detection and clinical significance when found in urine. He considers that these substances, although first studied in diabetic urine, are by no means associated with this affection alone. He regards the indigo reaction test for acetone the best. Heat a few crystals of nitro-benzaldehyde until dissolved, allow solution to cool and aldehyde to separate as a white cloud; add suspected fluid, and make mixture alkaline with dilute caustic soda. If acetone be present, there appears first a yellow, then a green color, followed by an indigo-blue in the course of ten minutes. If only traces of acetone be present the yellow fluid must be shaken with a few drops of chloroform, when the blue color will come. This test detects 1 part in 2500, if a distillate of urine be used.

For diacetic acid the chloride-of-iron test is recommended. To urine, as fresh as possible, add a few drops of moderately strong watery solution of chloride of iron. Remove any precipitate of phosphates by filtration, and to filtrate add chloride-of-iron solution. If a Bordeaux red color develop, boil a portion of urine and acidulate a second portion with sulphuric acid and extract with ether. Test ethereal extract with more solution of chloride of iron. Test also the boiled urine. If red reaction takes place vividly, the presence of diacetic acid may be inferred. The author agrees with Jaksch that traces of acetone may be found in natural urine, and that its presence may have little or no significance. Diacetic acid, on the other hand, never occurs in natural urine, and diaceturia is always a dangerous complication. Acetone is rarely responsible for symptoms of restlessness, excitement, and delirium in disease, but diacetic acid is, and is probably the cause of diabetic coma.

Tests for Albumen.—The necessary importance that is now being paid to the presence of albumen in the urine has led observers

to adopt means for estimating amounts by a rapid, easy, and accurate process. James Tyson,⁹ considers it practically impossible for the vast majority of physicians to use the gravimeter test for albumen, and as appliances like Esbach's albuminometer are inaccurate, we must, for the most part, continue the method of measurement by bulk, which is, he thinks, sufficiently accurate for practical purposes. If men will only estimate 25 per cent. or 50 per cent. of *bulk* they will, he assumes, be beyond criticism. At the same time, he is of opinion that it would be better to retain the percentage expression only for weight, and to speak of one-quarter or one-half bulk, as the case may be.

Austin Flint,⁹ treating on the same subject, supplies a method which is more accurate, and comparatively simple. He correctly observes that the only accurate method of determining the percentage of albumen in urine is to separate the albumen and then carefully wash dry and weigh it. His own process is not definite, but it enables the practitioner to obtain comparative results, sufficiently accurate for practical purposes. The apparatus consists of a tube, of which the accompanying drawing represents about one-fourth of the actual size, with an arbitrary graduation up to 100. In a test-tube of convenient size, he boils a little more than half a fluidounce (15 grammes) of urine, to which have been added four or five drops of ordinary acetic acid. If the urine be turbid, it should be filtered before being boiled. After thorough boiling and allowing the urine to cool for two or three minutes, it should be well shaken, in order to divide the precipitated albumen as finely as possible, and then the graduated tube is filled to the 100 mark. After twelve hours' standing, the percentage of precipitate is noted. The albumen will settle in twelve hours, and the volume of the deposit is not sensibly diminished if it be allowed to stand for twenty-four hours. The proportion of albumen measured in this way should be called *the percentage in volume of undried albumen*.

This method will indicate fairly well a proportion of 1 or 2



FLINT'S METHOD
OF TESTING FOR
ALBUMEN.
(*Medical News.*)

per cent. of albumen. When the proportion is less than 1 per cent., the ordinary method by contact, or by simple boiling with a few drops of acetic acid, would indicate "a trace" of albumen.

E. Spiegler ¹¹⁶ gives the following test for albumen:—

R Mercuric chloride,	8.00 grammes (ʒij).
Tartaric acid,	4.00 grammes (ʒj).
White sugar,	20.00 grammes (ʒv).
Distilled water,	200.00 grammes (ʒʒvij).

This reagent is used in the following manner: Some of it is poured into a test-tube to the height of 1½ or 2 inches; the urine, which has been previously rendered strongly acid with concentrated acetic acid, is poured slowly and gently down the side of the test-tube. At the level where the two fluids touch, a sharp white ring forms if albumen is present; a black background renders this ring more striking. Propeptone gives this reaction, peptone does not. The reaction occurs immediately when the amount of albumen in the urine equals or exceeds 1 in 150,000. If the amount of albumen is 1 in 225,000, the reaction takes a minute to appear. The object of the sugar is to increase the specific gravity of the reagent, in order to get a sharp distinction between the two layers of fluid. The use of the acetic acid is to prevent precipitation of phosphate or carbonate of mercury.

According to Drzewiecki, of Kiev, corresponding editor, ⁶⁷³ July
A. Jaworowski ⁸⁸² Nov. 1, '91 proposes a new reagent for albumen, which detects the presence of $\frac{1}{30000}$ part of albumen. (The other known reagents, as, for instance, Bödecker's, Millon's, acetic acid, and others, do not detect even the $\frac{1}{30000}$ part.) The reagent is prepared after the following formula: One part of molybdenate of ammonium is heated with 40 parts of water, and afterward mixed with 5 parts of tartaric acid, when, if the liquid is not clear, it must be filtered. For examination, the urine must be transparent and acid; if it is necessary to acidify it, tartaric acid is used. For the complete removal of albumen from the urine, add a few drops of the reagent and filter it; after filtration, add the reagent again, and so on till a precipitate ceases to be thrown down. Too much reagent must not be used at once, because the excess may redissolve the albumen. By this reagent, also, a very small quantity of mucus may be detected.

Sources of Error in Testing for Sugar in Urine.—George Johnson ² Apr. 3 says that he is not infrequently consulted by persons

being treated for glycosuria in whose urine he finds no trace of sugar. The reason is that natural urine contains two substances, viz., uric acid and creatinin, which resemble glucose in their reactions with the ordinary tests. He prefers the picric acid and potash test for glucose, as introduced by himself in 1882. For accuracy and ease of application, both as a qualitative and quantitative test, it surpasses all others.

When 1 drachm (4 grammes) of normal urine is boiled with the same volume of a saturated solution of picric acid and $\frac{1}{2}$ drachm (2 grammes) of liquor potassæ, a claret-red color is produced, a color which, compared with the standard, indicates what, if glucose were present, would be 0.7 grain (0.045 gramme) per fluidounce (30 grammes).

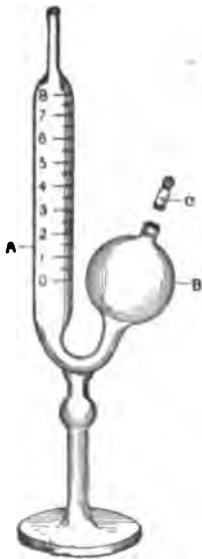
A good practical rule is this : that if in any specimen, treated as before stated, a red color appears through the liquid in a test-tube about one-half inch in diameter, no glucose is present. The smallest quantity of glucose, in addition to the creatinin, when acted on by the picric-acid and potash test, renders the urine so intensely dark-red that no light passes through the liquid.

The presence of albumen, whether in small or large amount, does not interfere with the quantitative analysis of saccharine urine by the picric-acid process, and this constitutes another advantage over the copper method, which requires a previous separation of the albumen.

Sulphates in Urine.—E. Freund⁸ gives a test for the estimation of sulphates as follows: Add 10 drops of a solution of alizarin of 1-per-cent. strength to 50 cubic centimetres (1 $\frac{1}{4}$ ounces) of urine; add 5-per-cent. acetic acid till mixture shows orange color; then add 5 cubic centimetres (1 $\frac{1}{3}$ drachms) more of acetic acid and triturate with a baryta solution (11.22 grammes—2 $\frac{1}{2}$ drachms—acetate of baryta in a litre—1 quart; 1 cubic centimetre = 3 milligrammes SO₃) until the precipitate becomes distinctly red. If the urine be dark, decolorize by acidifying with acetic acid and heating with zinc-powder, afterward removing the zinc by alkalizing with a solution of soda, boiling and filtering.

Quantitative Analysis of Sugar in Urine.—L. M. Scott⁶ describes a new and simple method of estimating sugar in urine, devised by Edgar Gans, of Carlsbad.²¹⁰⁸ The apparatus consists of a U-shaped glass tube about six inches high, the longer leg (A) of

which is graduated, as the annexed sketch shows, the shorter leg (B) terminating in a glass bulb, on the extremity of which fits a glass stopper (C). The sides of the bulb and of the stopper are pierced in corresponding diameters by two fine holes, so that the exit of air can be prevented by a slight turn of the latter. To use the instrument, first mix, in a flask, 10 cubic centimetres ($2\frac{2}{3}$ drachms) of the urine to be examined with 90 cubic centimetres (3 ounces) of clean water, and shake up with a piece of yeast about the size of



APPARATUS FOR ESTI-
MATING SUGAR.
(Lancet.)

a coffee-bean till there are no longer fragments of yeast floating about in the vessel. Then pour 10 cubic centimetres ($2\frac{2}{3}$ drachms) of this mixture into the bulb (B), and adjust the stopper (C) so that the holes in the bulb and stopper coincide. Now tilt the tube to the left, so that the level of the fluid in A corresponds with the zero on the scale, and, by a slight turn of the stopper, shut off communication with the atmosphere. Leave the instrument in an ordinary room-temperature (about 65° F.— 18.3° C.) for eighteen to twenty hours, and, fermentation going on, the liquid in tube A will rise from the point 0 in proportion to the amount of carbonic acid given off,—that is, in proportion to the amount of sugar in the urine. The instrument is so graduated that the points on the scale correspond to the percentage of sugar; so that if the fluid in A rises to 2.5 the percentage of sugar is 2.5. After repeated experiments, Gans found that, in accuracy, it almost equalled the method of polarization, while in cases of the simultaneous presence of sugar and albumen in the urine it could be used when the polarimeter could not.

DISEASES OF THE SUPRA-RENAL CAPSULES.

Joseph Coats ²¹³_{Age} relates a case of Addison's disease in which the tubercular nature of the lesions in the supra-renal bodies was demonstrated. The patient, a man aged 27 years, a slater and chimney-sweeper, on admission to the hospital, resembled a negro or mulatto, but with all the features of a European. The coloration

was visible all over the body, certain parts being more deeply colored than others, *e.g.*, the nipples and around them. The visible mucous membranes were not much colored, but there was an inky appearance inside the lips and cheeks, and a little dark coloration on the palate. The patient had been ill about a year, and, some three months before, had occasion to work a whole night and day, packing soot. After stopping work, he slept a considerable time, and, on waking, found that he could not lift his left arm as high as his head. This has continued, and is associated with great atrophy of the muscles of his shoulders. The weakness progressively increased, and, a few days before death, there supervened a condition of mental aberration, which continued till the close. There was very little elevation of the temperature at any time, the highest record being 100.4° F. (38° C.). The physical signs pointed to some affection of the lungs; there was marked depression under the left clavicle, with defective movement, dull percussion-note reaching down to an inch below the nipple, tubular respiration near the middle line, and increased vocal resonance at the extreme apex. There was great atrophy of the muscles of his shoulder—deltoid, supra-spinatus, and pectoralis major; there was very little cough or expectoration. Death took place with absolute suddenness. The post-mortem showed slight evidence of tuberculosis of the lung, and there was no other lesion of importance, except in the supra-renal capsules. One capsule presented a very pronounced caseation, and was large and lumpy. In the other the lesion was much less pronounced. The capsule was not greatly enlarged, but its normal tissue had disappeared, and its place was taken by a general, homogeneous, tough tissue, in which were a few caseous centres. Microscopical examination demonstrated that the lesion was tubercular, and there were tubercular bacilli in the capsules. The bacilli were not numerous, but unequivocal. The author points out the difficulty of connection between the lesions of the supra-renal capsules and the general symptoms. It is curious that a lesion in the skin, which means an excess of function, as it implies the formation of an excessive amount of pigment, should be associated with a distinctive lesion in the supra-renal capsules. Perhaps the explanation would be found in this: that the lesion in the capsules is at first irritated, and that the bronzing is produced in this early stage, and prob-

ably finished before the capsule is destroyed. The pigment produced would remain permanently if once laid down. But Coats is of opinion that the supra-renal capsules may have important functions in the way of special secretion, and that the suspension of these functions is the cause of the general symptoms. He offers this, however, only as a speculation.

Commenting upon the above case at the Glasgow Medical Chirurgical Society, on March 4th, H. M. Buchanan²¹³ pointed out that the supra-renal capsules had no involvement of the nervous system at all. In a previous case which he had examined, and which had been under the care of Hawthorne, the splanchnic nerves had been practically obliterated, as they passed behind the enlarged capsules, and had probably led to the stomach symptoms which had been observed in that case; and in the present case, when the splanchnic nerves were free, there was very little of gastric disturbance. The fact would indicate that these parts had no immediate relation to the cause of the disease. He had read an explanation that the disease was due to a disturbance of ganglia in the capsules of the supra-renal bodies, and that these ganglia were necessarily involved, very early, by the tubercular process, but had not been able, himself, to verify those observations. He observed that one gland was usually attacked before the other, and it was possible that for some time the patient, though thus attacked, could survive; the disease becoming fatal only when the other gland also was involved. He compared the association of the symptoms in Addison's disease with lesion in the supra-renals to the functional disturbances met with in exophthalmic goitre and diabetes.

Coats, in reply to Buchanan and other speakers, said, as to the point quoted by Buchanan, that he did not know that the ganglia mentioned were of much account, but some had asserted that the supra-renal bodies were really nervous ganglia. He considered that the suddenness of the deaths (Hawthorne's patient having also died suddenly) and the other mysterious phenomena connected with the disease, would be solved by finding out the functions of the supra-renal capsules.

H. Barbier,⁵⁵ in reporting on lesions of the supra-renal capsules and on sympathetic nervous lesions and Addison's disease, draws up the following conclusions: The disease may have its

origin (1) in a complex alteration of the capsule (gland and nerves), including tuberculosis of the latter, comprising the lesions described by Alezais and Arnaud—exceptionally cancer; (2) in an alteration of the abdominal sympathetic semilunar ganglia, the splanchnic, or the trunk of the sympathetic; (3) in an alteration of the spinal cord, having, probably, under its dependence the origins or points of passage of the nervous filaments passing to the abdominal sympathetic, and from there to the capsules, as explained in the researches of Kalindero and Babes, who found medullary lesions seated in the anterior and posterior columns with sclerosis of the vessels and other degenerative changes.

In relation to pigmentation, and other symptoms of Addison's disease, an editorial writer ^{July 6,} observes that, broadly stated, there are two main views of its pathogeny,—the one which refers the symptoms to chemical changes, and the other which claims that they all may be explained by nervous disturbance. As regards pigmentation, it has been ascribed to the presence in the blood of products which the healthy supra-renals destroy, thus establishing a sort of parallelism between this disease and myxœdema; again, it has been supposed to arise from direct nervous irregularity, a view supported by Raymond, based on a case of lymphadenoma, associated with marked melanoderma, but where the supra-renals were unaltered; whilst the great abdominal ganglia were seriously encroached upon by chronic inflammatory changes. Raymond believes that in the cutis there are chromatophorous cells, which, like those in the frog and chameleon, are under direct nervous control, and that they yield an excess of pigment to the Malpighian layer under certain conditions of nerve disorder. Pathological records, this author continues, afford many facts in support of this contention, and we need dwell no further upon it; but, quite recently, some important researches upon the normal supra-renals and the urine in Addison's disease have come to the support of the chemical or humoral doctrine. F. Marino-Zuco, director of the Chemico-Pharmaceutical Institute of Genoa, has found that, normally, these organs yield a notable quantity of neurin, which is also eliminated in appreciable amount in the urine in Addison's disease. In a communication by F. and S. Marino-Zuco, presented to the Academy of the Lincei, by Canazzaro, the subject is carried further. Experiments were first made to establish the

physiological importance of the supra-renal capsules, showing that animals in which both these organs were removed did not survive, but when one only had been extirpated the animal survived and increased in weight. From fourteen to twenty-four days after the extirpation of one capsule, circular slate-colored patches were observed in the shaven skin, from which sprang tufts of blackish hair of rapid growth. In the next place, they tested the action of neurin on animals, by injecting 2 to 4 cubic centimetres ($\frac{1}{2}$ to 1 drachm) of a 5-1000 solution into the peritoneal cavity. The daily injection of 2 cubic centimetres produced no constitutional disturbance, but, after six to eight days, small slate-colored patches, with thicker and darker hairs, were visible on the abdomen, and on shaving other parts of the body the same slate-colored patches were visible, increasing day by day.

The annexed plates, taken from Byrom Bramwell's beautiful work,²¹³³ depict, with such precision, the appearance of the tongue and mammæ, in a case of Addison's disease, that it was thought advisable to reproduce them in this article.

The bluish-black (blackberry-juice colored) pigmentary deposits on the tongue are unusually numerous and occupy an exceptional position; they are, for the most part, situated on the dorsum of the organ, especially toward the root. According to Greenhow, the pigmentary patches on the tongue are usually situated on its sides and edges.

The other engraving represents the right breast, the areola of the nipple, and the nipple itself as being almost black. Deep pigmentation of the areolæ of the nipples is a highly characteristic, though not by any means constant, feature of Addison's disease. Several cases have been recorded in which, although the pigmentation of the skin was considerable, the areolæ of the nipples were not more deeply pigmented than the skin in other parts of the body.



Appearance of the tongue in a
case of Addison's disease. (Byrom Bramwell).
Byrom Bramwell's Atlas of Clinical Medicine



DIABETES.

By R. LÉPINE, M.D.,
LYONS.

ETIOLOGY AND PATHOGENY.

Bernstein-Kohan²⁰⁰⁷ has, by the aid of forty-five observations, made a careful study of diabetes following traumatism. The traumatisms most often followed by diabetes are those affecting the head (25 in 45); sometimes also those affecting the vertebral column. Cerebral disturbance is mentioned twelve times. The symptomatology offers nothing special, except as regards the nervous system. Somnolence is not rare; insomnia is more frequent. At times there are psychical disorders, especially melancholia; disturbances of sensibility are frequent; sugar does not always appear in the urine immediately after traumatism, and in certain cases a series of nervous troubles fill up the period between traumatisms and the manifest beginning of diabetes; if the latter succeeds rapidly to traumatism, it is almost always mild; on the contrary, almost all the uncured cases of traumatic diabetes begin late. Progress is at times rapid; radical cures have been observed fairly often (14 cases out of 45), but seldom take place where diabetes has persisted more than six months or a year. In short, the slow onset of glycosuria after traumatism and its long duration are unfavorable elements in the prognosis.

Teschemacher⁴ reports the case of a boy of 7, recovering from measles, and presenting symptoms of incontinence of urine, which contained 4 per cent. of sugar. The child was hereditarily disposed to diabetes. Being sent to Neuenahr, the quantity of sugar, which at the beginning of treatment was 1.9 per cent., fell in eight days to 0.35 per cent. Although he had been permitted to eat bread, the sugar disappeared from the urine; but some time after, the child, being attacked by a dog, was very much frightened, and the next day the urine contained 3.3 per cent. of sugar. The day after it contained but 2.4 per cent., two days

(G-1)

later 1.5 per cent., and at the end of the week had again entirely disappeared.

Edward D. Fisher²⁶² states that we not infrequently find, in *sypphilis* of the nervous system, associated diabetes, and regards the seat of the disease as most often in the medulla or its neighborhood. In three cases of his own, he reports a specific endarteritis as being probably present, but, as none of the cases died, there was no direct investigation.

Holsti¹¹⁴ reports a case of glycosuria following influenza. The patient was an officer, 41 years of age, with a good family history, who had always enjoyed good health. In the middle of December, 1889, he had influenza, but not at all severely, as he was able to move about the whole time, though not feeling quite well. In the middle of February, 1890, he was seized with severe pains in the arm and leg, and looked upon this as a relapse of the disease. At the end of March he suddenly began to suffer from thirst, and it was remarked at the same time that the amount of urine increased. At the end of April sugar was discovered in the urine. A month later, when examined by Holsti, he was emaciated. The urine, of specific gravity 1039, contained 8.8 per cent. of sugar after ordinary diet. The patient was put on meat, cheese, and eggs, with Seltzer or soda-water as a drink. Three days later the sugar reaction had disappeared. The following days repeated examinations failed to discover the presence of sugar, although the patient was allowed to take sugar and other vegetable food.

R. T. Williamson, of Manchester,⁸⁰ has described two cases of pancreatic diabetes. A post-mortem examination of these patients was made by Ross and Mackenzie, of Burnley. In the first case, a patient aged 45 years, with a history of alcoholism, they found marked cirrhosis of the pancreas, several small cystic dilatations of the duct, and small calculi. In the second case they found marked atrophy and fatty degeneration of the pancreas. Williamson has collected 100 such cases, and found that there was atrophy (more or less marked) in 39 cases; very marked atrophy in 8; calculi in 4; marked fatty degeneration in 1; calculus in 14; cystic disease in 7; transformation into a firm mass of fibrous tissue in 12; divers conditions in 5; abscess in 3; cancer in 8. Considering the great frequency of the alteration of the pancreas in diabetes,—too great to be accidental,—the variety of lesions, and the

experimental results, the author considers the evidence to be in favor of a group of cases of pancreatic diabetes.

Vaughan Harley,²⁷⁷ completely removed the pancreas of eight dogs. Four of them only lived a few hours; the four others had sugar in the urine (up to 3.1 per cent.). He also completely destroyed the pancreas of four rabbits by means of the thermo-cautery. The animals lived from sixteen hours to three days, and in all four from 0.3 to 1.7 per cent. of sugar was present in the urine. The incomplete destruction of the organ in five other rabbits produced no glycosuria. The same author confirmed the fact,^{2, Aug. 27} according to Bernard, Brasol, and others, that sugar appears in the urine when the quantity of sugar in the blood reaches 0.3 per cent., and even 0.25 per cent., and lower still when injected into the veins of an animal. He accepts Lépine's theory of the failure of the glycolytic ferment, and thinks that the wasting and muscular feebleness cannot be explained by the non-digestion of food, but must depend upon some other cause, apparently non-assimilation consequent upon a form of auto-intoxication, arising from substances normally excreted by the pancreas being retained within the organism and there forming leucomaines. This view is supported by the fact that tissue-wasting occurs both in cases of ligature of the pancreatic duct and of partial extirpation of the gland; and, seeing that in these cases no sugar whatever is lost to the system, its mere loss of sugar cannot be regarded as explaining the tissue-wasting.

Aldehoff, of Marburg,³⁰¹ removed the pancreas of several fresh-water turtles, and observed that glycosuria appeared at the end of twenty-four or forty-eight hours, persisting in the greater number until death, which ensued in from six to twenty-three days. In frogs, he also succeeded in producing glycosuria, but only after four or five days—slight at first, becoming more intense later on.

Minkowski,⁴ produced diabetes in the dog, cat, and pig, by extirpation of the pancreas, but not in the bird or frog. He grafted a fragment of pancreas under the skin, but outside the abdominal cavity, and, when the graft had become attached, he removed the rest of the pancreas; no diabetes was produced except when the grafted portion was taken away. Glycosuria, at its maximum, sets in, after two or three days, in the dog deprived of the pancreas. After this time, whether the dog fast, or whether he be

fed with meat, the proportion of nitrogen to sugar in the urine is as 1: 2-7 or 2-8, which appears to prove that all the sugar produced by increasing the albumen is excreted. If a dog be deprived of its kidneys, the capability of the blood to retain sugar increases. The author confirms the fact that glycogen quickly disappears after removal of the pancreas, and adds a new fact, viz., that in an animal deprived of pancreas the levulose appears to be utilized, since only a small quantity is passed in the urine. De Renzi and Enrico Reale⁸⁴ have only been able to produce diabetes in the dog by complete extirpation in 75 per cent. of the animals experimented upon. In the others they observed simply a diminution in the assimilation of sugar, but no glycosuria in the absence of a proportionate amount of carbohydrates. By means of incomplete extirpation of the pancreas, they were also able to produce diabetes by means of resection of the duodenum. Resection of a lobe of the liver, or of the jejunum, for a distance of twenty-three centimetres, did not produce this result. Lastly, they succeeded in provoking glycosuria by the extirpation of the salivary glands (parotid and submaxillary); and, as favoring the existence of a salivary diabetes, they observe that the loss of saliva coincides with the emaciation and absence of the patellar reflex of polyuria and of glycosuria.

Minkowski,^{100, 101, 102} in reply to de Renzi and Reale, states that diabetes *never fails* to appear after complete removal of the pancreas, if the animals live a sufficient time after the operation. This statement is founded on fifty-five experiments made on dogs. Three times only did the sugar fail to appear in the urine, in three dogs which had succumbed during the first twenty-four hours. As to glycosuria after incomplete extirpation, he admits its presence, though in general it is slight; in one case, however, there was serious diabetes, although the fragment of pancreas left was fairly large (from 3 to 4 grammes— $\frac{3}{4}$ to 1 drachm). He regards glycosuria following the removal of the salivary glands as being slight and momentary, such as follows all traumatism.

The same author²⁰⁰¹ reproduces, with further details, previous experiments, showing that, after the complete removal of the pancreas outside the abdominal cavity, the diabetes fails to appear if a fragment of the gland has been previously transplanted under the skin. The method employed consists in leaving the pancreas in

connection with the intestine, and only grafting the tail under the skin. When the connection is made with the subcutaneous vessels the intra-abdominal portion of the pancreas is taken away. When the operation is successful the animal is rendered diabetic by the extirpation of the transplanted fragment—a relatively innocent and easy operation, since it can be done without opening the abdominal cavity. In conclusion, Minkowski observed no favorable effects from the use of jambul in dogs deprived of the pancreas, and he has little confidence in the benefits to be derived from levulose.

Thirolaix¹⁰ gives the history of a patient who was the subject of an article by Charcot (“*sur un cas de paraplégie diabétique*”),⁹⁴
No. 57, 70 and whose history has also been partly reported by Lancereaux.²⁰⁰²
p. 498 An autopsy was made. From a microscopical examination of these organs the pancreas were found to be perfectly healthy and non-sclerosed; the solar ganglia, on the other hand, were hypertrophied, and in size, as compared with healthy ganglia, were in the proportion of 4 to 1.

Thirolaix²⁰⁷⁷ details a certain number of experiments on dogs. In the first series he produced in several weeks a total atrophy of the pancreas by injecting into the pancreatic duct several cubic centimetres of essence of turpentine containing asphaltum in solution, or oil holding soot in suspension, and without resulting glycosuria. In a second series he made incisions into these atrophied remains of the pancreas, bringing about a transitory glycosuria. In a third series he removed a portion of the pancreas, after which he observed, contrary to Minkowski, symptoms of intense glycosuria, lasting several days. Finally, in a fourth series, he removed almost the whole pancreas and noticed constant diabetes. On autopsy, lesions of the solar plexus were observed. These facts lead him to admit that “experimental diabetes produced by the removal of the pancreas was not the effect of suppression of a special function of the pancreas, but the expression of a secondary alteration of the glycogenic function; the peripheral excitation reflecting on the bulb leads to troubles not only in the glycogenic centres (liver, muscles, intestinal canal), but in the entire individual. Pancreatic diabetes owes its short evolution, the special phenomena of rapid denutrition, to alterations in the nervous abdominal system upon which depend all the functions presiding over what is taken into the economy.” In short, Thirolaix’s whole work goes to prove

that ablation of the pancreas *only acts by reflecting on the nervous system*. Such is the essential and fundamental conclusion.

A few months later Thiroloix, in considering the refutation made by Lépine to this theory (see below), and the results of pancreatic grafting, as practiced by Minkowski, Hedon, and himself, entirely modified his theory of pancreatic diabetes, arriving ^{751 410}_{p. 202, No. 1} at Lépine's conclusion that the pancreas produces the greatest portion of glycolytic ferment or the greatest destruction of sugar; a theory which agrees with the best established facts up to date. The suppression of that source of ferment is the chief element in the production of diabetes.

Lépine ⁹²_{pp. 402, 491; Nos. 37, 38} ¹¹³ studies the relation existing between the lesions of the pancreas and diabetes. He remarks, with Ferraro, that certain lesions of the pancreas (and of the nervous abdominal system) may, at times, be followed by diabetes; but, this much admitted, there remain a certain number of clinical and experimental facts showing the importance of these lesions in the pathogeny of diabetes. These lesions decrease the source of the glycolytic ferment in the economy, and Lépine proves its existence in the blood during life by means of a double series of experiments on artificial circulation in the paws of dogs. In the first series the dogs were deprived of their pancreas, and in the second the pancreatic nerves were cut, increasing the quantity of glycolytic ferment in the blood. The results were very different. In the first series the blood lost less sugar than the second. This difference was not present in normal animals, in which Lépine afterward proved the same difference in the destruction of sugar (glycolysis), not by causing the circulation of the blood, but by keeping it for a certain time in flasks, at the temperature of the animal. The study of glycolysis is thus rendered much easier. By following this simplified proceeding, one is convinced that the blood of a diabetic loses less sugar than that of a healthy man, relatively to the quantity of sugar which it contains. If a cannula be introduced into the pancreatic duct of a dog, and a few centimetres of sterilized oil or sterilized salt water be injected, and the pancreatic duct tied, an increase of glycolytic fermentation is observed in the blood. There are other sources of glycolytic fermentation besides the pancreas; hence the non-appearance of diabetes in the dog whose pancreas has been slowly sclerosed by Thiroloix's procedure.

Lépine³⁰⁴_{No. 48} has localized the vicarious sources of the glycolytic ferment. The salivary glands and the mucous follicles of the upper part of the small intestine possess this ferment in a larger amount than the blood. Further, these organs produce after death, if placed in a suitable temperature, a large quantity of sugar; the pancreas also produces such a large quantity of sugar that the production almost hides the loss following removal of the organs. Thus, the liver is not the only organ having the glycogenic function, but such organs as the pancreas, which possesses no glycogen, that produce sugar at the expense of material other than hydrocarbons, seemingly at the expense of peptones. In fact, Lépine⁹²⁷_{Aug. 26} has found that the blood brought into contact with a small quantity of purified peptones, produced a quantity of sugar equal to about one-tenth of the total quantity of sugar produced within the body.

Lépine and Barral⁹²⁷_{Aug. 26} repeated an experiment of Arthus, showing that, if the jugular vein of a horse be tied at both ends, no sugar is lost as long as the blood does not coagulate, and, in consequence, the glycolytic ferment should occur at the same time as the coagulation. On repeating this experiment, the authors modified it somewhat. Instead of leaving the extirpated vessel in a jar, they suspended it alternately from one or the other end, every five minutes, so that each end in turn was the higher. In other words, they agitated the blood at quick intervals, instead of allowing it to settle. Although the blood did not coagulate, they observed a glycolysis almost as intense as if, instead of leaving the blood in its own vessel, they had left it in a flask at the same temperature. They conclude, from this experiment, that no relation exists between glycolysis and coagulation of the blood, and that the conclusion of Arthus, that the glycolytic ferment is a post-mortem product, is not justifiable.

The same authors⁹²⁷_{Dec. 22, '91} discovered (1) that, by prolonged asphyxia, the glycolytic power may completely disappear; (2) that phloridzin diabetes has nothing to do with the diminution of glycolysis, but only with increased production of sugar; (3) that the diastatic ferment of the blood is contained in the plasma, and not in the globules; (4) that the diastatic ferment of the urine is not increased in diabetics. They²¹¹_{Feb. 14} have also studied the action of some medicinal agents employed in diabetes. According to them,

antipyrin favors the retention of the glycolytic ferment within the globules, thus reducing glycolysis; hence, if it be sometimes useful in diabetes, it is by diminishing still more the formation of sugar. Jambul increases the glycolytic power, but also increases the production of sugar; so that it does not always have a favorable effect. Morphine does not sensibly modify the glycolytic function; its beneficial action in diabetes is evidently due to its inhibitory effect on the production of sugar.

Lépine⁹²⁷_{Jan. 15} points out that the hyperglycæmia which at times accompanies intoxication by veratrine does not tend to diminish the glycolytic power, but to increase the production of sugar. He also states,²¹¹_{July, 24} experimentally, that the hyperglycæmia produced by a cold bath tends to the diminution of the glycolytic power.

Kramer,⁶¹_{July 25} in a long series of experiments with ox-blood, has found that both defibrinated blood and a mixture of three parts of blood and one part of a saturated solution of sodium sulphate showed a glycolytic power. This, however, was not manifest during the first hour, was 10 per cent. the second hour, and became greater (20 per cent.) after four to five hours at 39° C. (102.2° F.) After twenty-four hours at 23° C. (73.4° F.), decomposition being prevented by the addition of thymol, 75 per cent. of the sugar added to the blood had disappeared.

Capparelli,²⁰⁹⁹ having produced glycosuria by injecting saliva into the veins of an animal, *supposes* that, in animals made diabetic by removal of the pancreas, the salivary ferment would have a more energetic action than in healthy animals. Hedon⁹²⁷_{Nov. 25} has refuted this hypothesis by producing diabetes in a dog, previously deprived of its salivary glands, by extirpation of the pancreas.

Leo³¹⁹_{Nov. 26} criticises Ebstein's theory, that diabetes is produced by an insufficient production of CO₂ by protoplasm. Leo argues that if insufficiency of CO₂ cause an exaggerated production of sugar, increase of CO₂ would, on the contrary, diminish the sugar. Now, it has been demonstrated that an atmosphere containing 2 per cent. of CO₂ increases by one-fourth the proportion of CO₂ in the tissues. Basing his experiment on this fact, the author caused three diabetics to breathe this atmosphere without observing any increase of glycosuria.

C. Voit³⁴_{Nov. 2}; ³⁹¹_{v. 29, p. 227} made experiments, through his pupils, Otto, Abbott, Lusk, and Fr. Voit, on the amount of glycogen in the liver

after the ingestion of glucose, cane-sugar, levulose, and maltose by rabbits and chickens. The glycogen in these cases was found to be very much increased, while the ingestion of galactose and sugar of milk produced scarcely any glycogen. This fact appears to show that these two latter sugars are not transformed into glucose in the intestine, while cane-sugar and maltose partially change into glycogen. As confirmation of this fact, Voit says that if one introduce these sugars under the skin the glucose and levulose *alone* notably increase the proportion of glucose in the liver.

Fr. Voit ³⁹¹_{v. 22, p. 266} has sought to determine the effect of sugar of milk in diabetes. To distinguish in the urine this glucose, he has had recourse to fermentation, with a pure culture of *saccharomyces apiculatus*, which makes the glucose ferment and leaves intact the sugar of milk. The diabetic who served for this experiment submitted to a regimen exempt from carbohydrates, to which was added a certain quantity of sugar of milk—one day 100 grammes ($3\frac{1}{2}$ ounces); another day, 150 grammes (5 ounces). The first day the urine contained 49 grammes ($1\frac{3}{8}$ ounces), and the second day 104 grammes ($3\frac{1}{2}$ ounces) more than usual, and the sugar excreted by the urine was glucose.

Cremer and Ritter, ³⁹¹_{v. 22, p. 490} experimenting on fowls and rabbits in a state of inanition, caused a considerable elimination of glucose by the administration of phloridzin.

Röhmann ²⁴⁶_{v. 22, p. 197} made a fistula into the thoracic duct and injected a solution of glycogen into a lymphatic of the paw. He observed a slight augmentation of the sugar in the lymph.

Bial ²⁴⁶_{v. 22, pp. 197, 198} confirms the fact established by Lépine and Barral, that the diastatic saccharifying ferment is contained in the serum of the blood, and not in the globules; according to him, this ferment is distinguished from that of malt, of the saliva, and pancreas, by the fact that it transforms starch, not into maltose, but into glucose. This fact was already known, as regards the pancreas. The quantity of glucose which is produced at the expense of the starch is about the same as that produced by heated hydrochloric acid. When saccharification is incomplete, dextrin, as well as glucose, is formed. The same ferment doubles the maltose and achroödextrin; glycerin very greatly reduces the action of this ferment. Human blood, above all that of the newborn, has a saccharifying power much weaker than that of certain animals.

Moritz²⁰¹ asserts that the urine of healthy persons must give the reaction of sugar to phenylhydrazin, but in such a small quantity as to be practically unimportant. The author discusses the subject of alimentary glycosuria, or, better, glycuria. The ingestion of a large quantity of glucose produces a glycosuria, of levulose a levulosuria, of cane-sugar a saccharosuria; further, if the quantity of cane-sugar ingested be very large, there is at the same time glycosuria, and, perhaps, even levulosuria (?). [It is known that cane-sugar separates into glucose and levulose.] After the ingestion of sugar of milk in large quantities, the author until now has found only glucose in the urine, but the presence of lactosuria is quite probable. The ingestion of macaroni in as strong a dose as possible did not produce glycosuria. In relation to the facility with which alimentary glycosuria may be produced, a great difference was observed in different individuals. Lactose appeared to produce it most easily and glucose the least, cane-sugar having but a medium power. This alimentary glycuria is transitory.

Kraus and Ludwig⁸⁴ have confirmed the results of Worm-Müller and Hofmeister, relative to the assimilation, in a physiological state, of a considerable quantity of chemically-pure glucose (200 grammes—6½ ounces). On the contrary, in two cases of hepatic cirrhosis, there was, after the ingestion of 100 grammes (3½ ounces), a glycosuria which lasted from two to five hours; but, in other cases of cirrhosis and other diseases of the liver, there was not seen much difference from healthy individuals as regards the assimilation of sugar. In Basedow's disease, as well as in a case of diabetes insipidus, the author observed a diminution in the assimilation of glucose. Kolisch³¹⁹ has found that if, after ligation of the superior mesenteric artery, a dog be given from 3 to 5 grammes (45 to 75 grains) of glucose, there supervenes, in from two to three hours, a notable glycosuria, the urine containing as much as 6 grammes (1½ drachms) of sugar per litre (quart), in such a degree that one-eighth of the sugar ingested is eliminated. This glycosuria is certainly due to the ligation of the mesenteric artery; for opening of the abdomen, etc., if the artery be not tied, is not followed by glycosuria, which may also be produced by tying a number of the branches of the mesenteric artery.

J. Grösz, of Epstein's clinic, at Prague,¹⁵⁸ has studied fifty cases of glycosuria in infants, all breast-fed and under 4 weeks old.

Twenty-four were in good health. Most of the others had gastrointestinal symptoms. He found (1) often an increase of reducing substance in the urine; (2) minute quantities of carbohydrates; (3) no glycosuria in healthy, breast-fed infants; (4) in cases of digestive disturbance and especially in gastro-enteritis, a strongly reducing, optically active substance, giving promptly the qualitative reactions for sugar, but not fermentable (milk-sugar or some product or subdivision of it); (5) glycosuria of breast-fed infants is of alimentary origin. The assimilation limit for milk-sugar in nurslings is very high, being in healthy, breast-fed babies about $3\frac{3}{10}$ grammes (50 grains) per kilogramme ($2\frac{2}{10}$ pounds) against $1\frac{4}{10}$ grammes (22 grains) in the adult. In cases of even mild digestive disturbance this limit is lowered. The author concludes that glycosuria, in cases of digestive disturbance, is due to lowering of the assimilation limit, and perhaps to the influence of intestinal bacteria upon the disintegration of sugar.

A. E. Wright²¹⁸⁸_{p.16, vi} states that a patient who assimilated perfectly 25 grammes ($6\frac{1}{8}$ drachms) of sugar excreted 6 grammes ($1\frac{1}{2}$ drachms) by the urine if he ingested 50 grammes ($1\frac{1}{2}$ ounces), and that he excreted 9 grammes ($2\frac{3}{8}$ drachms) if he ingested 100 grammes ($3\frac{1}{8}$ ounces). He observed for some time, in a patient, the daily excretion of sugar, nitrogen (determined by the method of Kjeldahl), and of acetone (determined by the iodoform test), without finding any relation between the quantity of sugar and acetone. The latter varied from 0.75 to 2.08 grammes ($11\frac{1}{2}$ to $32\frac{1}{4}$ grains), while the variations of acetone and nitrogen were parallel. For example, on days when the excretion of nitrogen was maximum (19.7 to 23.4 grammes—5 to 6 drachms), that of acetone was between 1.19 and 2.08 grammes ($18\frac{3}{8}$ and $32\frac{1}{4}$ grains); average, 1.43 grammes (22 grains). On the contrary, when the excretion of nitrogen was minimum (12.9 to 19.8 grammes— $3\frac{3}{8}$ to 5 drachms), that of acetone was only 0.79 to 1.79 grammes (12 to 28 grains); average, 1.09 grammes (17 grains). With Hallervorden he insists, in these cases, upon the augmentation of ammoniacal excretion. The administration of alkalis is sometimes, but not always, useful.

The author has also studied glycosuria following the administration of phloridzin and phloretin. With the latter he was not able to provoke glycosuria in the rabbit; while he found that the glycosuria produced by phloridzin might be accompanied by

the excretion of diacetic acid, there being neither acetone nor oxybutyric acid in the urine. The liver of animals is rich in preformed sugar, and without admitting the theory of von Mering, that the liver of animals in a state of inanition must be rapidly deprived of the glycogen, he thinks that this sugar comes from the albumen of the tissues.

K. Sauer²⁴⁶ states that from his experiments he finds that the glycosuria of curarized animals is due exclusively to insufficient ventilation of the lungs, and that if artificial respiration be properly carried on the glycosuria is absent. The author has, also, sought to determine the cause of the slight action of curare when administered by the mouth. Gaglio explained this by admitting that the liver retained the curare, as it does certain metallic poisons. Several experiments by extirpation of the liver appeared to lend support to this hypothesis, and several experiments of Sauer himself, showing a relatively powerful action in curare absorbed by the œsophagus or by the large intestine, might also be interpreted in the same sense; but certain direct experiments of the author completely refute the theory of Gaglio, the injection of curare into a mesenteric vein being followed by rapid intoxication, thus demonstrating that the poison is in no way retained by the liver. Zuntz²⁴⁶ thinks that the acidity of the gastric juice sufficiently explains the want of action of curare administered by the mouth.

G. Bufalini⁴⁷⁷ has observed that chlorhydrate of ammonia and asparagin diminish at the same time urea and sugar in the diabetic. Hans Leo¹¹⁴ publishes twenty experiments made upon five diabetics, two having a grave form of the disease, which prove, contrary to the opinions of Pettenkofer and Voit (but modified afterward by Voit), that the absorption of oxygen and the exhalation of carbolic acid are not diminished in diabetics, if their weight was considered. The following are the figures obtained by him by causing his patients to breathe for several minutes into the apparatus of Zuntz and Geppert, the volume of gas being calculated by minutes and the kilogrammes by weight:—

	CO ₂ .	O.	Quotient.
First patient (grave),	3.21	4.01	80.0
Second patient (mild),	2.98	3.87	74.4
Third patient (mild),	3.21	2.84	81.0
Fourth patient (mild),	2.80	3.48	80.0
Fifth patient (very grave),	2.84	4.27	66.5

In all these experiments the patients had fasted for several hours, but the figures do not differ much from those obtained by Geppert and Lewy, and are within the limits of physiological variations, which depend principally on the state of nutrition of the individual, and are least in the obese diabetic. The author notes that the figures do not agree with the gravity of the disease; for instance, in the third case, in which the disease was particularly mild, the figures are smallest, and in which there was no sugar in the urine, even at the time of the experiment. They were greatest in the last patient, whose condition was very grave, the figure for oxygen being the highest.

Leo has also made several experiments upon diabetic patients as regards digestion. According to him, in these conditions the exchange would not differ notably from that which takes place normally. However, it is to be noticed that, in the last patient affected with severe diabetes, the quotient (fasting from 66) would not reach more than 70; which proves that in him the hydrocarbons did not give rise to carbonic acid in very great quantity.

Henriot⁹²⁷_{Feb. 22} has studied more closely the quotient in the diabetic as compared with the healthy man. It is known that in the latter it is less than 1.00, it being readily understood that the fatty and albuminoid matters contain less oxygen and nitrogen than is required to transform all their hydrogen into water and ammonia. In consequence, the oxygen absorbed in respiration must burn up the excess; and, as carbonic acid contains its own volume of oxygen, the volume of oxygen absorbed must be greater than the carbonic acid given; in other words, the quotient must be less than 1.00. In the healthy man, during the digestion of carbohydrates, it is no longer the same; the carbohydrates contain exactly the quantity of oxygen necessary to convert into water all their hydrogen; consequently, their combustion produces an equal volume of carbonic acid. Further, by causing a healthy subject to ingest 50 grammes (1½ ounces) of glucose in a litre (quart) of water, Henriot has made the quotient reach 1.25, proving, evidently, that the carbohydrates are doubled in carbonic acid, and, in another substance less rich in oxygen, probably fat. But in grave diabetes these two processes do not take place; after the ingestion of glucose, the respiratory quotient is not sensibly increased, proving that, in these cases, neither combustion of sugar nor reduction has taken place.

Leo ⁸⁹ states that, primarily or secondarily, there is disassimilation of nitrogen in diabetes, which one must limit as much as possible. This is accomplished by the use of fats, as recently shown by von Mering and Klemperer. As to the action of carbohydrates, it is more complex; but if on the one side we may hope to restrain the disassimilation of albuminoids by fats, on the other side we cannot deny that they augment the glycosuria and the quantity of urine, thus contributing to the excretion of nitrogen. But this decidedly unfavorable action, however, must not cause us to overlook the important fact discovered by Külz, that even in grave diabetes the carbohydrates are partially utilized, which fact has recently been confirmed by Tröje, in Naunyn's clinic. As yet, however, there is no proof that this partial utilization really corresponds to a diminution in the disassimilation of the albuminoids, as Leo has now proven in several cases of diabetes. He recognizes, nevertheless, that the employment of carbohydrates cannot long be continued, and that periods of abstinence from them are necessary.

Graham Lusk ³⁰¹ _{D.M.A.M.} under the direction of Voit, has studied in himself the restrictive action of carbohydrates upon the disassimilation of nitrogen. In the first series of experiments, he used a diet of meat, milk, biscuit, butter, sugar, extract of meat, coffee, wine, and also took 128 grammes (4 ounces) of albumen, containing 20.5 grammes ($5\frac{1}{4}$ drachms) azote, 59 grammes ($1\frac{7}{8}$ ounces) of fat, and 357 grammes ($11\frac{1}{2}$ ounces) of carbohydrates each day. On an average, he excreted, during the three days of experiment, 18.5 grammes ($4\frac{3}{4}$ drachms) of nitrogen by the urine and 1.3 grammes (20 grains) by the fæces; he thus gained 0.7 gramme ($10\frac{3}{4}$ grains), corresponding to 4.5 grammes ($1\frac{1}{2}$ drachms) of albumen. In the second series, in which the biscuit was replaced by gluten bread, he used the same quantity of nitrogen, 58 grammes ($1\frac{7}{8}$ ounces) of fat, and only 11 grammes ($2\frac{5}{8}$ drachms) of carbohydrates, and lost (in excess of the nitrogen ingested) 6.5 grammes ($1\frac{2}{3}$ drachms) of nitrogen, corresponding to 40.4 grammes ($1\frac{1}{4}$ ounces) of albumen. Thus the non-use of 346 grammes ($11\frac{1}{2}$ ounces) of carbohydrates led to the disassimilation of 45 grammes ($1\frac{3}{8}$ drachms) of albumen. In a third series, he deprived himself of meat; in consequence, he absorbed daily only 58 grammes ($1\frac{7}{8}$ ounces) of albumen, corresponding to 9.2 grammes ($2\frac{1}{2}$ drachms)

of nitrogen, 50 grammes ($1\frac{1}{2}$ ounces) of fat, and 348 grammes ($11\frac{3}{8}$ ounces) of carbohydrates; he lost per day 3.9 grammes ($59\frac{1}{4}$ grains) of nitrogen, corresponding to 24 grammes (6 drachms) of albumen. Finally, in a fourth series of experiments, the biscuit was again replaced by gluten bread; he absorbed 58 grammes ($1\frac{1}{3}$ ounces) of albumen, corresponding to 9.2 grammes ($2\frac{1}{3}$ drachms) of nitrogen, 50 grammes ($1\frac{1}{2}$ ounces) of fat, and 3 grammes (46 grains) of carbohydrates. He lost 8 grammes ($2\frac{3}{8}$ drachms) of nitrogen, corresponding to 50 grammes ($1\frac{1}{2}$ ounces) of albumen. In comparing these results with those of the third series, it will be seen that by depriving the subject of 349 grammes ($11\frac{1}{4}$ ounces) of hydrate of carbon a disassimilation of 25.7 grammes ($6\frac{1}{2}$ drachms) of albumen is effected.

Langendorff ¹⁸²_{p. 476, '91} states that extirpation of the lung in the frog allows the animal to live for several days without leading to glycosuria. He kept, in comparatively the same conditions of temperature, etc., two frogs thus mutilated and two curarized frogs, the latter being glycosuric. In one of the first he made section of the spinal cord in the inferior portion, the animal becoming glycosuric. He thinks, with Winogradoff, that curare-glycosuria depends upon the diminished consumption of sugar by the paralyzed muscles.

Galeotti ⁸⁵⁴_{Apr. 18} gives a review of recent contributions upon glycosuria and acetonuria following extirpation of the cœliac plexus, based upon the researches of Lustig, Peiper, Oddi, and Viola, who first directed their labors in this direction upon the fundamental basis established by Lustig and Oddi, that extirpation of the cœliac plexus is followed by grave troubles of nutrition, notably by acetonuria; and often by glycosuria.

Trambusti ⁸⁵⁴_{Sept. 19} studied the same subject, but not from the same stand-point as other authors. At the suggestion of his master, Lustig, he made researches upon the hyaline and glycogenic degeneration of the kidneys and liver following extirpation of the cœliac plexus. The experiments were made exclusively upon the dog; but he made, besides, comparatively the same researches in dogs and rabbits in a state of inanition or intoxication from acetone, and in which the cœliac plexus was intact. In animals in which the cœliac plexus was extirpated, the kidneys showed the following condition: Vessels of the cortical and medullary substance

congested; their walls presented the reaction of glycogen; the tubuli contorti were much enlarged; the cells, in places, enormously swollen, as also the epithelium of the tubes of Henle (ascending and descending branch). Iodized gum showed, in all the swollen epithelium, a glycogenic reaction. This substance was sometimes disseminated equally in the protoplasm, sometimes showed itself in granulations of varying size. The author thinks that there was a double process of infiltration and degeneration.

Several times there was also found a notable dilatation of the vessels, and in some places little areas of hæmorrhage. With iodized gum the acini stained a dark brown in all that part of the cellules that in their preparation with hæmatoxylin and eosin remained uncolored.

The white globules of the blood showed also the presence of glycogen in much greater abundance than in animals in which the cœliac plexus was healthy. The author insists that the glycogenic degeneration is absent in the other organs, and is therefore localized in those in which the nerves are cut (liver, kidneys); in animals poisoned with acetone there was nothing similar observed, while in rabbits dead from inanition the hepatic and renal cells showed no traces of glycogen, but its reaction was found in the vessels of the liver and kidneys.

CHEMICAL TESTS FOR SUGAR IN BLOOD AND URINE.

Pathology. — Pickardt⁸⁸_{op. cit.} has treated a certain quantity of fresh blood by acetate of zinc after the method of Abeles, and after concentration over a water bath he used the phenylhydrazin test, obtaining crystals of glucosazone, which, from their appearance and melting-point (204° to 205° C.—399.2° to 401° F.) left no doubt as to their nature.

Sieveking publishes a case²_{no. 100} of diabetes in which the density of the urine varied from 1010 to 1014.

Von Jaksch⁸⁸_{no. 200} describes certain methods of indicating the sugar in urine, or at least of proving its presence. He also treats of transitory, alimentary, and permanent glycosuria, and their relations with grave diabetes, giving the treatment of the latter. Von Jaksch considers the phenylhydrazin method the surest of all for discovering minute quantities of sugar, in spite of the criticisms of Penzoldt, Geyer, Moritz, and Luther, which, it must

be said, have been refuted by Hirschl, Rosenfeld, Pollatschek, and Binet. The maltose can only with difficulty be confounded with glucose seen as maltosazone at melting-point (190° to 191°C .— 374° to 375.8°F .), almost sixteen degrees below that of glucosazone; further, it deviates to the right in a more pronounced manner than does glucose; so that if, after boiling the urine with sulphuric acid, its reducing power increases, one may suspect the presence of maltose.

Transitory glycosuria has been observed, according to von Jaksch, in meningitis, in certain acute infectious diseases, but in a slight degree, after certain intoxications (morphia, carbonic oxide and other gases), and more rarely as the consequence of cerebral lesions.

The author has made some personal experiments on the subject of alimentary glycosuria, giving to several patients 100 grammes ($3\frac{1}{4}$ ounces) of pure glucose. In cases of leukæmia, anæmia, Bright's disease and tuberculosis, as well as in diseases of the liver, no positive results were obtained. There was a negative result in four cases of chorea, three of tabes dorsalis, three of sclerosis in plaques, two of progressive paralysis, three of hemiplegia, etc. The result was positive, on the contrary, in four cases of cerebral diseases more or less extensive.

As to true diabetes, it was characterized by the excretion not only of glucose, but of large quantities of nitrogenous products. Rosenbach⁸¹⁹ has found that if one mixes a solution of glucose or of sugar of milk with several drops of caustic soda and of nitroprussiate of soda, saturated *à froid*, and then heats the mixtures, one obtains more or less rapidly, according to the proportion of sugar, a deep, red-brown stain, or a red-orange, which, even if the solution contains only a thousandth part of sugar, manifests itself by a deep-yellow stain. The glycosuric urine presents the same coloration with the above reagent; it is only necessary to note the red coloration which is produced in alkaline urine (not glycosuric) by the simple addition of nitroprussiate of soda, caused by the creatinin (Weyl's reaction), and which disappears with heat.

Seegen⁸ recalls the fact that Fehling's solution is a sure reagent for the detection of small quantities of sugar, provided that filtration through animal charcoal be first done, as indicated long ago. He adds that the detection of even small quantities of sugar

is always important, and that he has proved its presence in the following conditions: (1) in the initial stage of diabetes; (2) in obesity, in old age, and in certain nervous states, notably in neurasthenia; (3) as the remains of a cured diabetes, of which he reports several cases.

Binet¹⁹⁷₇₄₋₂₂ has studied the principal tests for small quantities of sugar, and gives preference to that by phenylhydrazin. He has employed it in the examination of the urine in various diseases, especially in diphtheria. In 32 mild cases of this disease he found sugar twice, while in 38 grave cases he observed it twenty-seven times. He thinks that asphyxia contributes to glycosuria, but that it is not the principal factor, for in 19 cases of croup he found sugar but eleven times.

Lenné⁶⁰₇₄₋₂₂ has studied the daily curve of the elimination of sugar in a diabetic of 21 years, and insists upon the variations of this curve, in spite of the uniform conditions of life. He observed (1) that in twenty-four hours many elevations of the curve might occur, independently of the diet; (2) that an increase of urine does not necessarily prove an invariable increase in sugar; (3) that generally there is less urine and more sugar during the day and more urine and less sugar during the night; (4) that there is no correspondence between the density of the urine and the quantity of sugar contained in it; (5) that during a given time a diabetic patient may eliminate more water than he has ingested.

Albertoni⁴⁷⁷₇₄₋₂₂ has studied the resorption of maltose, cane-sugar, and sugar of milk in the dog, as well as their action in the organism. His experiments were conducted as follows: After a fast of twenty-four hours the animal was given $2\frac{1}{2}$ to 6 grammes ($38\frac{1}{2}$ grains to $1\frac{1}{2}$ drachms) of the substance, per kilogramme ($2\frac{1}{2}$ pounds) of live weight; an hour later he was killed by the injection of air into the jugular vein; the pylorus being tied, the sugar in the stomach and in the intestine was separately estimated. The results were as follow: The resorption of cane-sugar and maltose is greater and takes place one hour sooner than that of glucose, reaching 70 or 80 per cent. of the amount ingested. Sugar of milk is absorbed more slowly, being in more concentrated solution, and in the stomach as well as in the intestine as much more of the liquid is found as the solution was more concentrated. This increase would perhaps explain the purgative action of sugar of milk, but weak

solutions, as milk, are much more rapidly and completely resorbed. Sugar of milk and levulose, in solution, in doses of $\frac{1}{2}$ to 1 gramme ($7\frac{1}{2}$ to $15\frac{1}{2}$ grains) per kilogramme ($2\frac{1}{2}$ pounds), injected into a vein, elevate the pressure from 10 to 20 millimetres of mercury, as does glucose; but, inversely to the latter, the pulse is slackened. Levulose possesses no diuretic action, while sugar of milk, on the contrary, incontestably does.

Salkowski and Jastrowitz³⁸⁵_{No.19} has found that the urine in morphinomania reduces sulphate of copper if heated with caustic soda, and gives, although slowly, an abundant precipitate of copper oxide, while polarization and fermentation give a negative result. With phenylhydrazin a precipitate of osazone, about 3 grammes (46 grains) to the litre (quart) of urine, is obtained. This osazone is distinguished from glucosazone by its point of coagulation, 158° C. (316.4° F.), which is much lower than that of glucosazone, and by the fact that it is soluble in water. On certain days the urine of this patient also contained sugar. Ebstein³⁸⁵_{No.21} says, apropos of the above communication, that if from 9 to 29 grammes ($2\frac{1}{8}$ to $7\frac{1}{8}$ drachms) of xylose be given to a healthy subject, it is passed by the urine, and gives a strong reaction, save that it deviates to the right under polarized light.

Garnier and Voisin¹⁸⁴_{No.2} observed in the urine of an elderly woman, supposed to be diabetic, the following peculiarities: Quantity, three to four litres (quarts) per day; density or specific gravity, 1010; color, pale yellow (No. 2 of Vogel); after the addition of caustic soda, brown color; after the addition of Fehling's solution, cold and hot, small deposit of copper oxide; action upon polarized light, none. These results would prove the absence of sugar in this urine, and cause one to suppose that alkapton was present, which is inactive with polarized light, which becomes brown in the presence of alkalies, in absorbing the oxygen which does not ferment, and which maintains its reducing properties after having undergone the action of yeast.

COMPLICATIONS.

Vizioli⁴⁵⁹⁰_{Dec.14, '91} believes that in diabetes, intermittent claudication is always a sign of the existence of a hyperplastic endarteritis; that it precedes gangrene, and is, consequently, a sign of great prognostic value. In one case referred to by the author, the dis-

ease was accompanied by a fatal attack of angina pectoris, apparently proving that the coronary arteries had taken part in the endarteritis. The sign under consideration will, therefore, be of great service in diagnosing doubtful or ill-defined cases of diabetes.

Vergely ⁷³_{1,2,3} publishes two cases of herpes zoster in diabetes, and adds some observations from the literature on the subject. Rosenthal ⁴¹₁ presented before the Berlin Society of Dermatology a diabetic, aged 70 years, in whom the glans and the prepuce, especially the mucous surface, were much tumefied by contact with urine containing 6 per cent. of sugar. It was impossible to retract the prepuce. At the same time there was a discharge from the urethra. Treatment consisted in the application of vaselin, boracic acid, and dermatol.

Fournier ¹⁷_{1,11} has made a careful study of eczema of the genitals in diabetes. The first symptom is pruritus. When there are cutaneous lesions, they are first erythema, then eczema, acute or chronic. He describes in detail the varieties found in men and women.

Malcolm Morris and J. Jackson Clarke ⁶⁹⁷_{1,2} relate the cases of xanthoma diabeticorum (to the number of twelve) previously published, and add another of their own, with microscopic examination of the tumor, excised during the life of the patient. They insist upon the suddenness of appearance of xanthoma multiplex, upon its seat upon the nape of the neck, the trunk, and the extremities on the side of extension, and upon the absence of icterus, which does not prevent the xanthoma of diabetics from belonging to the same family as xanthoma planum and xanthoma multiplex.

Radcliffe Crocker ⁶⁹⁷_{1,2,3} reports a new case of xanthoma in a man of 30 years. The eruption in this case was on the buttocks, appearing next on the front of the arm, then on the elbows and knees, the lesions gradually increasing in number on the buttocks, where the eruption was most developed. The papules varied in size from that of a millet-seed to a pea, and had a slightly reddish tinge, unless the skin was scratched, when the color was yellow. There were no telangiectases on the papules, and there was not a distinctly red base with a yellow apex, such as is often seen in these cases. On the elbows, the whole papule was more distinctly yellow than on the buttocks, but was of a much paler shade than is usual in ordinary xanthoma. The patient was a well-nourished

(but not obese), healthy-looking man. Subsequent examination proved that he passed $3\frac{1}{2}$ pints ($1\frac{1}{2}$ litres) of urine in the twenty-four hours, and that it contained 18 grains of sugar to the ounce. The author excised a papule, and examined it microscopically, concluding from this examination that the process is an inflammatory one, and that, in spite of the neoplastic aspect of xanthoma planum in its highest development, it is also due to an inflammatory process, as Chambers long ago asserted and Touton disputed.

Lenné⁴¹ believes that albuminuria in diabetes depends not only upon an excess of albumen in the blood, as, for example, following the excessive use of eggs, etc., but also upon a particular disposition toward other diseases to which a healthy man is not liable.

Senator¹⁰⁴⁰ has studied pneumaturia in diabetes, produced by the development of gas in the bladder, due to the fermentation of sugar, known only since the communications of Gérard, du Mesnil, Thomas, and Fr. Mueller. In the patient who was the subject of this last writer's analysis, much hydrogen was found in the gas; in Senator's case, there was principally carbonic acid; it was due to alcoholic fermentation, which is in accord with the fact that the urine was always acid, and contained cellules of yeast. The fermentation of sugar in the bladder explains the fact, proven in clinical experience, of the disappearance of sugar from the urine in diabetic patients affected with cystitis. The agents of fermentation are the clostridium butyricum for the butyric fermentation, and the torula cerevisiæ for the alcoholic fermentation. There are, besides, various bacteria capable of producing the gas (Eisenlohr, Fabre).

Finder²¹²⁴ has drawn upon French literature of the past year to show the reciprocal relations existing between diabetes and the psychoses. He insists, following the school of the Salpêtrière, upon the frequency of the disease, either in families where there is a history of insanity, or following violent emotions, grief, pain, etc. As to the psychoses which develop in the course of diabetes, they usually take the form of melancholia. It is rarely that maniacal excitement is observed, circular insanity being oftener seen. The relation between the intensity of the glycosuria and the evolution of the psychoses has not yet been definitely determined; it is only known that there is sometimes an alternation between the glycosuria and the mental trouble.

Cohn, ³¹⁹ in discussing the above thesis, adds that he has recently observed the following case: A man of 35 years, of neuro-pathic tendency, but until then in good health, was taken suddenly with a maniacal excitement, with hallucinations, etc. Several days later, an examination of the urine, made by chance, showed 4½ per cent. of sugar. An antidiabetic regimen was instituted, and the mental tone was quickly restored, while at the same time the sugar disappeared from the urine; but since that time, if the patient, who previously enjoyed excellent health, makes any digression from the regimen prescribed, sugar re-appears in the urine, and there is also some cerebral excitation, with cephalalgia, etc. Thus, in this case, there was not an alternation between the two conditions, but rather a correlation.

Guinon and Souques ³⁴ in an important memoir, discuss the association between tabes and glycosuria, and establish the following points: (1) glycosuria in diabetes, a rare but certain symptom; (2) pseudotabes in diabetes,—that is, the existence in the patient of pseudotabetic symptoms, due to diabetic neuritis; (3) the co-existence of true diabetes and true tabes, following or preceding diabetes. It is a coincidence, but not an accident, bearing the same relation as does arthritism and neuropathy. Charcot has given a great deal of light on this subject. The co-existence of other nervous diseases with diabetes is well known, as mental alienation, epilepsy, hysteria, and exophthalmic goitre. Guinon and Souques themselves report several observations, from which it is seen that there is an alternation of tabes with diabetes in the various members of the same family, exactly as diabetes alternates with mental alienation and neuroses; and the co-existence of both diseases in the same individual. Their final observations are as follow: 1. A man of 59 years, with a double hereditary tendency; neuropathic on the paternal side and arthritic on the maternal. 2. Jewish man of 56 years, double hereditary tendency; as in the preceding case, father neuropathic and mother arthritic. 3. Man of 60 years; no known hereditary taint. 4. The same. The authors adduce a case reported by Fischer, which appears to be also an example of the association of tabes with diabetes. In order to be able to affirm that the case is really one of tabes and not of false tabes, the authors call attention to the following symptoms: 1. Laryngeal crises, which are exceptional,—if, indeed, they

exist at all in true diabetes. 2. Motor inco-ordination, which has no analogy with *steppage*. 3. The vesical troubles of tabes, which have no analogy with those of diabetes. 4. The ocular troubles, bilateral myosis, the Argyll-Robertson sign, atrophy of the optic nerve, which belong essentially to tabes and not to diabetes; it might be well, also, to add ocular paralysis. But these have been seen in diabetes, in truth, transitory and mobile. To be able to affirm, on the other hand, whether the patient is affected with diabetes or with a simple glycosuria dependent on tabes, one must take into account that in the latter case the amount of sugar is little elevated, that there is neither polydipsia or polyphagia, and, finally, that the glycosuria of tabetics, a bulbar symptom, is often accompanied by the following symptoms: Anæsthesia in the region of the trigeminus, frequency of the pulse; in the second place, gastric and laryngeal crises, functional troubles of the vocal cords, convulsive cough. The presence of these symptoms in a tabetic favors the diagnosis of glycosuria, and not of diabetes. In the appendix, the authors publish (1) a communication by Latil upon a family of which nearly all the members were affected with Friedreich's disease, and of which one was diabetic (without tabes); (2) several other observations from the clinic of Charcot, proving the connection between either diabetes and nervous diseases, and particularly of diabetes and tabes.

Koettnitz ⁶⁹_{Dec. 3, '91} infused into the veins of a woman of 43 years, in a state of diabetic coma, $\frac{1}{2}$ litre (1 pint) of a physiological solution of chloride of sodium, containing 15 grammes (4 drachms) of bicarbonate of sodium and 21 grammes ($5\frac{1}{4}$ drachms) of pure carbonate of soda. The immediate result was that the patient made several movements and was able to reply to questions, without opening her eyes, however. The improvement lasted only ten or fifteen minutes.

Born ²¹⁴_{Jan. 1, '93} relates the case of a woman of 24 years, seven months pregnant, whose former condition was good, and who, suddenly, after several days of malaise characterized by acid discharge, acceleration of pulse, followed by constipation and vomiting, fell into a state of coma and died in several hours. The urine for the last three or four hours contained 8.5 per cent. of sugar and 0.1 per cent. of albumen. Autopsy revealed fatty degeneration of the kidneys, and apparently, also, of the liver.

Shaffer¹⁹ publishes the history of a child of 14 years, who had never been ill. On December 27th the parents noticed that he drank three or four glasses of water at dinner; that he passed half a chamberful of water during the night; drank water during the night, and mentioned feeling thirsty during the day. Was skating January 4th. On the 5th, exhibited dyspeptic symptoms, which were promptly met. There was a tendency to constipation, and the excessive micturition and thirst continued. On the 8th there was labored respiration, mostly thoracic, with decided hebetude; 9th, at turn of night, he was moribund, but rallied under stimulants and external applications; temperature from 96° to 98° F. (35.55° to 36.66° C.). There was sufficient consciousness six hours before death to cause him to attempt to protrude the tongue and to cry out several times. He died comatose at 10.30 A.M. The urine passed on the evening of the 8th was limpid, with acid reaction, specific gravity 1032, and was loaded with sugar.

Wilfred Watkins-Pitchford² reports the case of a boy of 8 years and 9 months, who, for about a fortnight, had been complaining of dryness of the throat and mouth. He passed more water than was natural, of a specific gravity of 1035, free from albumen, but giving evidence of sugar; the pulse was strong—80. A few days after being placed on diabetic diet, a marked change occurred. The respiration suddenly doubled in frequency. No physical signs of disease could be detected in any part of the lungs. The patient vomited once or twice, at intervals of a few hours. The temperature was subnormal. The following day the patient died. In the twenty-four hours preceding death sixteen ounces of urine were passed, of a specific gravity of 1040. It had a strongly acid reaction, with abundance of sugar and one-sixth albumen. Eighteen days before the appearance of any decided symptoms, this boy's mother died of pulmonary phthisis.

Parker Douglas,² in alluding to this case, cites that of a young man of 18 years, a teetotaller and non-smoker. On December 3, while at a dance, he struck the back of his head against the floor, when about to sit on a chair which someone suddenly removed. The injury caused but little inconvenience, but within a day or two he complained of thirst, this being the first symptom of any derangement. On December 9th, though feeling very unwell, he kept about as usual. The following day he vomited once.

On December 13th he became semi-conscious, with the extremities cold, eyes glassy, pupils contracted, respiration 21, uneven, every eighth or tenth inspiration being sighing; temperature, 98.4° F. (36.8° C.); urine, 1027 specific gravity, with sugar, but no albumen. Pulse from 150 to 160. Death took place early in the morning.

Vaughan Harley,² reports two cases of pancreatic diabetes, the first exceptionally rapid in its progress. It was that of a medical student, who died in Christiania, aged 23 years. The quantity of urine varied from 4 to 6 litres (quarts) in twenty-four hours, and contained, on an average, 2 per cent. of sugar. His breath had the characteristic apple-like odor. He rapidly fell into a comatose state, although, to the last day of his life—which was eleven days after the sugar was discovered—he could be temporarily roused from his stupor. At the necropsy, the kidneys were found to be normal in appearance; but, on microscopical examination, the epithelial cells of the tubules were seen to be finely granular (fatty degeneration). The pancreas was converted into an irregular-shaped mass, of about the size of a duck's egg, with a cavity the size of a cherry, filled with greenish-yellow, sero-purulent fluid. The next case was that of a rich banker, who died at the age of 64 years, from diabetes, with cancer of the pancreas. The patient was healthy until the summer of 1882, when he had an attack of boils. The urine contained sugar (1 per cent.). In the summer of 1883 it had increased to 5 per cent. In the beginning of 1886 he began to lose his appetite. By September the skin of the whole body had assumed an icteric tint, which became more marked up to the time of his death, in October. At the autopsy a tumor was discovered in the head of the pancreas, of varying consistency in different parts.

Hache,⁵⁷⁷ at the necropsy of a diabetic woman, aged 36 years, dying from phthisis, found the pancreas perfectly healthy, and, at the same time, having an areolar appearance of the parts immediately adjacent to the central veins; in thin sections, the protoplasm of the cells contained clear spaces, which did not stain with osmic acid or iodine. The author thinks that this morbid condition had some relation to the diabetes.

Stroynowski,⁵⁸⁰ on the basis of eleven cases under his own observation, states that diabetes not only causes suppression of the catamenia, but also distinct atrophy of the uterus and ovaries.

TREATMENT.

Riggs⁶¹_{May 15} makes some very just remarks upon the general treatment of diabetes, and especially upon the regimen. As to drugs, he recommends beginning with small doses, gradually increasing until the symptoms disappear, or until the limit of tolerance is reached. The results from this plan are certainly more agreeable than those obtained by an abrupt administration of large doses, beginning well up toward the physiological limit, and rising rapidly to it. He recommends the alkalies, but with moderation and in the form of table waters, not claiming more than that an agreeable drink is thus given to the patients. He does not insist upon opium, owing to the gastro-intestinal symptoms and the danger of hebetude caused by it. Codeia is, in most cases, less open to both these objections than is any preparation of opium itself. Strychnine is also frequently employed, but, if good effects are not noted when fairly small doses are employed, there is little reason to expect much from larger doses. In the employment of arsenic, it is probably better to use either the liquor potassii arsenitis or the preparation of bromide of arsenic known as Clemen's solution. The strength of these two solutions is identical.

Ralfe²⁰⁵¹_{Mar.} divides cases of confirmed diabetes into two classes: (1) alimentary, in which the sugar is at first entirely removable by dietetic restrictions; (2) general, in which, from the onset, only a portion of sugar is reduced by diet. His observations lead him to conclude that in purely alimentary diabetes any addition of starchy or saccharine food to the diet causes an exacerbation, whilst in the general form any relaxation of diet leads to an increase of the "non-removable" sugar. In one case, in which on strict diet the proportion of removable sugar was as 5 to 1, it became, after a short resumption of mixed diet, only 1 to 1.6. Further, the relaxations proposed were insufficient to combat any theoretical dangers resulting from a proteid diet. The diabetic often took too much proteid, and neglected the green vegetable food. Opium and its derivatives should not be administered as long as the glycosuria can be entirely controlled by diet, and the signal not to increase the drug is the cessation of a fall of sugar when an increase is made, or when an actual rise takes place in face of it. With regard to its mode of administration, the most decided results follow when the drug is administered by the mouth.

He had found that administration after a meal had a greater effect in restraining diuresis than when given upon an empty stomach; that not much difference is effected on the excretion of sugar, but that the dose, taken shortly after food, has the great advantage of not disordering the stomach, causing nausea, or impairing digestion, as when taken fasting. As to the best method of preparation, he had come to the conclusion that the full benefit of the drug in diabetes is not obtained unless some of its other derivatives are combined with the alkaloid. Though both codeine and morphine restrain the sugar excretion and the diuresis, greater success is obtained when some preparation of crude opium is added to either alkaloid. This can be done by combining liquor opii with acetate of morphia in solution, increasing or diminishing one or the other, as circumstances seem to require. Diabetics often exhibit individual peculiarities as regards the different preparations of opium. In one case (a woman) codeine and morphine were tried on several occasions, and had to be given up on account of the headache and giddiness which were produced. Solid opium, in the form of a compound soap-pill, was, however, taken without any discomfort. Lastly, each patient has his proper dose, and, as soon as that is ascertained, the full benefit of the drug will be felt.

J. Mayer¹⁹⁹ considers that the prophylaxis of diabetes consists in regulating the life of the patient, and the treatment in regulating the diet. He fears a vigorous meat diet, which may lead to coma. For the thin diabetic, he advises the use of butter (150 to 200 grammes— $4\frac{3}{4}$ to $6\frac{3}{8}$ ounces—per day). It is seldom useful to push the albuminoids beyond 100 to 120 grammes ($3\frac{1}{4}$ to 4 ounces) per day. Of the carbohydrates, 80 to 100 grammes ($2\frac{1}{2}$ to $3\frac{1}{4}$ ounces) may be allowed, preferably in two doses. As to medical treatment, opium has but temporary effect; quinine and arsenic are often useful; lithium may often be combined with arsenic. Antipyrin, in doses of from 20 to 30 grammes (5 to $7\frac{1}{2}$ drachms), must not be continued more than eight to ten days. Finally, thermal waters may often be combined with hydrotherapy and gymnastic exercises, with benefit.

Ebstein has written a brochure on the treatment of diabetes.²¹⁸⁵ The first chapter of his work is purely historic, recalling the prescriptions of Rollo, Marsh, Prout, de Bouchardat, Pavy, Chambers, Cantani, and others. In the second chapter he gives his own

method. He thinks that the diminution of carbohydrates must be proportionate to the severity of the disease, and adds that these foods should not be permitted, because those considered as permissible must not be taken except in certain quantity, and according to the state of the patient. Hence it is very important to maintain the correct proportion of albuminoids: for a robust man, it is sufficient to give 127 grammes ($\frac{1}{4}$ ounces), which is equivalent to 700 grammes ($22\frac{1}{2}$ ounces) of thin, raw beef; but a diabetic may also eat eggs and cheese, both rich in albumen, diminishing in so much the quantity of meat. These aliments have, besides the advantage of being rich in fats, of which the diabetic must consume more than the healthy man, and which, according to him, are burned up without forming derivatives susceptible of transformation into sugar. Ebstein cites the case of a young woman suffering from severe diabetes, who took every day 225 grammes ($7\frac{1}{4}$ ounces) of butter and animal fat, with pleasure. The state of inanition in which she was found disappeared under this diet so rapidly that in two years and a half she had gained 10 kilogrammes (22 pounds). Such a quantity of butter, besides what exists in meat, is amply sufficient to furnish the necessary amount of carbon. The fat must be given fresh. Another source of carbon is fresh vegetables, indispensable to the diabetic, if only to facilitate the incorporation of fat. Campbell, whose views, following Griesinger, are the best from a practical point of view, recommends the cruciferæ, and especially cabbage, because of their cheapness; then cauliflower, Brussels sprouts, sea-kale,—excellent, but, unfortunately, too expensive.

As to the question of bread, the bread of almonds, composed of a large portion of albumen and of fat, will not be generally used, for almonds, like walnuts and filberts, can only play a secondary role in the diet. Leyden has stated that Seegen's almond bread, is unpleasant, as is that of Soja. It has been attempted to utilize the Topinambour for diabetics, on the theory that it contains scarcely anything but inulin. But, according to Tollens, it has been found to contain levulin in the proportion of 8 to 12 per cent., with inulin in summer, in winter and in autumn, with many varieties of sugar with right rotatory power, and perhaps cane-sugar.

Inosit, hitherto classed among the carbohydrates, and which in reality belongs to products of the addition of benzol, is found, as

is known, among the numerous vegetables, particularly green beans and cabbage; these must not be forbidden in diabetes. Mannite cannot be employed as food, on account of the dyspeptic phenomena most often produced. Sometimes salsify and mushrooms, which contain mannite and hydrate of carbon, may be given in diabetes, if their use does not augment the sugar in the urine. Inulin has been employed by Kulz in the preparation of a bread similar in taste and appearance to almond bread. But the high price of a kilogramme of inulin (more than 40 francs) makes these attempts practically useless. Levulose, on the contrary, could perhaps be employed, since it may now be obtained for 14 francs. The bread of Aleuron is still more satisfactory. (See further.)

It is desirable to avoid alcohol, except in certain cases where, as in other diseases, the patient requires stimulation. Experience has not been favorable to its use in ordinary diabetes. Griesinger has seen its abundant use increase the sugar in the urine. It is also necessary to regulate the amount of too salty or too highly seasoned food, as well as that containing oxalic acid, especially in individuals who present symptoms of the uric diathesis. Hydrotherapy must be employed very early. Camplin justly lauds salt-water baths, cold in summer and hot in winter, followed by friction. He also recommends woolen garments. Muscular exercises are of service in robust diabetics, and under medical direction. The passive movements of Zander have been found useful sometimes, but, the more active the movements, the greater the benefit. Almost always the patients are cured of polyuria, partly because of the greater activity of the functions of the skin. There is a diminution of sugar, and of the quantity of urine. The ergostat is also of service; thus, in one patient, labor of 10,000 kilogrammes caused the sugar to fall to nothing at the end of two days.

Warm climates also have a favorable influence, if the patient is not too feeble. On the other hand, Hösli, of St. Moritz, attributes to mountainous climate a prophylactic influence.

In the concluding chapter of his work, Ebstein endeavors to sustain his hypothesis as to the nature of diabetes (see the refutation of Leo, p. 8), and some additional notes are given upon various subjects, especially that of Aleuronat bread. The same author⁸⁹_{No. 10} praises this gluten bread, to which Hundhausen has given the name, "Aleuronat," and which would seem to be preferable to

ordinary gluten. It is a yellow powder, almost without taste and without odor, keeps better than flour, and is cheaper than meat; it contains at least 80 per cent. of nitrogenous matter and 7 per cent. of carbohydrates. Like ordinary gluten, bread cannot be made of this powder, but ordinary flour must be added, the bread thus made having a good taste and being easily digested. Aleuronat is also of service in making sauces, soups, etc. Ebstein thinks that a diabetic can eat $\frac{1}{2}$ a pound (248 grammes) of bread daily, containing 50 per cent. of dry nitrogenous matter.

Gerlach,²¹ in two cases of mild diabetes, did not observe any result from the employment of *szygium jambolanum*. In the first patient, who was upon a mixed diet, 20 to 40 grammes (5 to 10 drachms) per day did not control the excretion of sugar; in the second case, who took carbohydrates in large quantities, 30 to 60 grammes (1 to 2 ounces) of the drug increased the sugar. The author employed exclusively the powder of the seeds.

Baymer²⁰²₁₇₄ has also tried jambul in two cases, but with good results. The first patient was a male, 55 years of age, who had been declining in health for about a year. There was $5\frac{1}{2}$ per cent. of sugar. He was ordered 1 drachm (4 grammes) of fluid extract of jambul, together with half a grain (0.032 gramme) of codeine sulphate, one-half hour before retiring. Three weeks after he felt better and had gained $4\frac{1}{2}$ pounds (2 kilogrammes), while there was only 4 per cent. of sugar. It was now decided to try the powdered jambul-seeds. Accordingly, 12 grains (0.78 gramme), together with $\frac{1}{8}$ grain (0.0081 gramme) of codeine sulphate, were given four times a day. Four months later only a trace of sugar was present. The second case was that of a lady, 53 years old, whose father is said to have died from diabetes. She passed a great deal of urine, of a specific gravity of 1040, and containing $8\frac{1}{2}$ per cent. of sugar. Treatment identical to that followed in the first case gave similar though not so marked results. The author concludes that the drug exerts a favorable action by reducing the quantity of sugar in the urine, and, in addition, by keeping the bowels in a well-regulated condition,—a feature of great importance. He attributes the more rapid improvement of the first case to the fact that the patient was in such a condition that he could give up his work and rest.

George Foy,²² publishes a very complete article upon the

materia medica of jambul, giving the bibliography of its literature up to 1892. Henrichs^{2188; 2} reports his experience with the drug. He used either the powdered bark and seeds, or a decoction of the same. The daily dose of the powdered seeds was from 10 to 35 grammes (2½ to 9 drachms). As to any beneficial effects, the author's observations were entirely negative.

Raimondi and Rossi⁶¹⁶ publish a case of diabetes treated by jambul. The patient was a woman of 58 years, long ill; she passed daily six litres (quarts) of urine, containing 300 grammes (9½ ounces) of sugar. Upon an animal diet for one month she increased rapidly in weight, but continued to excrete 100 grammes (3½ ounces) of sugar. In six weeks she took, in all, 200 grammes (6½ ounces) of fluid extract of jambul and 100 grammes (3½ ounces) of powdered seeds. There was progressive general improvement, diminution of the polyphagia, slighter diminution of the polydipsia and polyuria, the sugar being reduced to 12 per cent. During a suspension of the drug it rose again to 13, 17, and 19 per cent., decreasing again when the jambul was resumed. Finally, the patient gained 10 kilogrammes (22 pounds) in weight during her stay in hospital, and the sugar was reduced to 28 or 30 grammes (7½ to 7¾ drachms) in the twenty-four hours. The author considers that in this case the advantage of combining jambul with meat diet is evident. In a previous paper he reported another case with equally favorable results. The patient, under the influence of meat diet alone, had the proportion of sugar reduced from 5 per cent. to 2.5 or 2 per cent.; then with the jambul it was reduced to 1.3 or 1.1 per cent. On discontinuing the drug, the proportion of sugar rapidly rose again to 1.6 or 2 per cent. The authors believe that much of the want of success with this drug is due to the fact that a number of different plants are known under this name in India.

Hildebrandt⁴ has made several experiments, which, to him, appear to prove that extract of jambul has a weakening effect upon the diastasic ferment in the human organism.

Weil⁵⁷ has employed a decoction of wild bilberry in a case of saccharine diabetes. His patient was a telegraphic clerk in Berlin. In January the sugar was 2 per cent., gradually increasing until in March it had reached 3 per cent.; April, 6 per cent.; June-July, 6 per cent. His mode of living was hitherto unre-

strained, but after restriction to meat diet the daily excretion fell to 4.7 per cent., about the beginning of August. Receiving little encouragement medically, he resorted to the following empirical treatment: Pure meat diet, with plenty of fat, which he enjoyed; for drink, white wine, with a litre (quart) of bilberry tea, daily, made from the green leaves of the plant. Under this treatment the sugar gradually disappeared from the urine. The last analysis, made at the end of January, showed 1.6 per cent. Seven weeks before this examination he had all restraint on diet, and had been since daily using white bread, peas, etc.

In regard to the preparation of the bilberry decoction, the leaves are pulled before the berries are ripe, and 2 handfuls infused in 2 litres (quarts) of water, and boiled down to 1 litre. Weil does not offer any suggestion as to the therapeutic action of this preparation.

F. C. Demarest, ⁶¹, placed a diabetic patient on antipyrin for one week, and found that at the end of this period the sugar had been reduced, but he was obliged to stop the use of the drug, on account of its usual unfavorable action on the heart. He made another trial with it and was glad not to continue its administration longer, on account of the alarming prostration and cardiac depression.

FEVERS.

By JAMES C. WILSON, M.D., AND AUGUSTUS A. ESHNER, M.D.,

ASSISTED BY

W. REYNOLDS WILSON, M.D.,

PHILADELPHIA.

GENERAL CONSIDERATIONS ON FEVER.

Thermotaxis in Fever and Under the Influence of Antipyretics.—Stern ¹¹⁴_{R.S.,H.I.} has made a study, in man, for the purpose of determining the accuracy of the doctrine of Liebermeister that the essence of fever lies in a displacement of the heat-regulation to a higher level. As in health there is provision against variation in temperature, in consequence of the influence of exposure to heat or cold, so in the febrile state there is a tendency for the temperature to maintain its elevated level. If an attempt be made to artificially reduce this level, the body sets other processes in action, in an endeavor to prevent this reduction. Thus, the body protects itself against elevation of temperature by diaphoresis and against reduction of temperature by involuntary muscular contractions, resulting in an increased production of heat. The persons under observation were placed in a bath at the temperature of the body, the temperature being changed gradually, in order to avoid all cutaneous irritation. The occurrence of sweating was taken as an index of the counter-regulation against a lowering of the temperature, and involuntary muscular contractions as an index of the regulation against elevation of temperature. Observations upon healthy persons showed that a counter-regulation—as indicated by sweating—was manifested when the rectal temperature was raised from 0.1° to 0.8° C. (0.18° to 0.144° F.), and that involuntary muscular contractions occurred when the rectal temperature fell to the same degree. Persons hardened to cold reacted less delicately, a temperature reduction of 0.8° C. (0.144° F.) being required to cause muscular twitching. A febrile patient, with a fairly constant temperature, responded similarly to changes of temperature,

(H-1)

though, perhaps, less actively than a person in health. The former was also more readily cooled, and, perhaps, more readily warmed, than the latter. If the temperature of a febrile patient rises rapidly, the nervous centres are often already adjusted for the higher temperature, while the body is yet considerably cooler. There is a sense of decided chilliness; the body endeavors to attain the new temperature constant as speedily as possible. This is facilitated by artificial warmth by means of warm bathing, which is most efficient under these circumstances. The conditions are reversed if there is rapid decline of temperature. The oppressive sense of heat is relieved by cold baths. In the case of febrile patients, the antipyretics reduce the heat-regulation to a lower level. The body strives to give off its excess of heat speedily. This is facilitated by a cold bath. It is, therefore, wise to conjoin cold baths with the administration of antipyretics. Antipyretics, in active doses, do not influence the intrinsic heat in healthy persons; they do, however, render the heat-regulation more sensitive and increase its capability. The temperature thus displays a tendency to pursue a straight line. Other conditions of elevated temperature, such as overheating by elevation of the surrounding temperature, poisoning with β -hydronaphtholamin, injury of certain parts of the nervous system, are attended with elevation of temperature and increased metabolism of albumen—as is fever—but are to be distinguished by the fact that they are not associated with an alteration of the heat-regulation, but with an insufficiency of the adjunct forces of heat-regulation. Such animals do not oppose any resistance to their elevation of temperature, and submit to reductions of temperature to the normal, or lower, before the counter-regulation makes itself manifest. True fever may be associated with a non-febrile elevation of temperature. Then the non-febrile plus of heat may be eliminated by cold baths, without the manifestation of a counter-regulation, although there may be considerable reduction of temperature. There then remains the true febrile temperature; if the reduction of temperature is continued, the counter-regulation appears, and furnishes an index of the temperature for which the heat-regulation is adjusted.

The Blood During Fever.—Stein, of Vienna, ³¹⁹_{June 11} has made examinations in 168 persons to determine if the blood undergoes any

distinctive changes in the febrile process. In some cases the number of corpuscles was counted; in most cases the quantity of hæmoglobin was measured and the specific gravity taken. The examinations were made before and after defervescence (spontaneous or medicinal), and before and after the action upon persons without fever of agents that cause vascular dilatation, such as antipyrin, antifebrin, and pilocarpine subcutaneously. In 14 cases of the first category the examinations were made (1) in anticipation of the fever, (2) during the febrile period; in 11 cases (1) during the febrile period, (2) during spontaneous defervescence; in 63 cases (1) during the febrile period, (2) with the beginning of the action of an antipyretic, as antipyrin, antifebrin, or salol. The first group of 14 included 2 cases of sepsis, 8 cases of influenza, and 4 febrile cases in which spontaneous remissions took place. The blood was examined when the temperature was normal, and again when it was elevated. The intervals between examinations were made as short as possible. In 9 cases elevation of temperature was attended with increased specific gravity; in 5 cases there was no noteworthy alteration. In 11 cases of spontaneous defervescence the specific gravity of the blood became less as the temperature became normal. The findings in the cases of febrile persons treated with antipyretics were not so constant. Of 63 such cases, a lowering of the specific gravity was observed in 39, with the decline of the temperature; in 9 no change was observed; in 15 there was a slight increase in the specific gravity. Here it appeared as if the time element was important, and as if with increased intensity of action of vaso-dilator and diaphoretic agents more rapid changes in the specific gravity occurred. Examinations were made in 80 persons in practically normal condition, before and after the action of agents that caused vascular dilatation: in 53 a more or less decided lowering of the specific gravity was observed, in 8 there was no change, and in 19 there was an increase in the specific gravity. In the great majority of cases changes were observed in the concentration of the blood. Elevation of temperature was in most cases followed by increased density of the blood; spontaneous decline of temperature was always, and medicinal lowering of temperature in most cases, followed by lowered density. It is thus seen that changes in temperature are attended with changes in the lumen of the vessels, and in most cases with

changes in the density of the blood. The results were not quite as clear when dilatation of the vessels was brought about medicinally in persons without fever. In most cases dilatation of the vessels was accompanied with lowering of the density of the blood. In consequence of the large number of deviations from this result, however, it is difficult to come to a definite conclusion in this connection. Perhaps the cases in which numerous examinations were made during the brief continuance of the action of pilocarpine may afford an explanation. These showed, on several occasions, a variation in the density with a return to the previous level after profuse perspiration, perhaps in connection with the amount of fluid immediately available in the organism.

Anomaly of Axillary Temperature.—Hattie, of Halifax, ²⁸³_{Jan} has reported the case of a man, 21 years old, who received a blow in the left temporal region, causing a fracture of the skull, with immediate loss of consciousness. He was able to be about in a few days, but was irritable and suspicious of those about him. These symptoms continuing, the head was trephined, and a large clot of blood was removed from between the dura and the bone. The operation was followed by an acute maniacal attack, after the subsidence of which the mental symptoms began to improve slowly and the man was sent to his home. The improvement was but temporary, and a second operation was performed, without, however, finding a cause for the symptoms. Slight improvement also followed this operation, but the man soon became cross and irritable and suspicious that those about him were conspiring to kill him; at times he was inclined to be violent and abusive. While under observation he had a febrile attack, which it was suspected was dependent upon an exacerbation of a latent, undetected tuberculous process, for which suspicion, however, there was not adequate evidence. During this attack the axillary temperature differed on the two sides of the body, being almost invariably higher on the right side (*i.e.*, the side opposite that of the injury) than on the left. In explanation of this anomalous phenomenon, it is suggested that a hypothetic heat-centre in the cortex cerebri, close to the motor area, had been injured.

Means of Taking the Temperature Speedily.—Hausmann ⁵⁷_{Dec. 18, '91} succeeded in obtaining reliable records of the temperature by holding the bulb of the thermometer before the orifice of the urethra

while the patient urinated. He admits the limitations of the application of the method, but claims as advantages the rapidity with which the observation can be made and the assurance afforded against deception. He has found that the temperature taken in this way is 0.3° or 0.4° C. (0.54° to 0.72° F.) lower than the rectal temperature, 0.1° or 0.2° C. (0.18 to 0.36° F.) lower than the temperature of the mouth, and 0.2° or 0.3° C. (0.36° to 0.54° F.) higher than the temperature of the axilla.

Post-Febrile Insanity.—Hurd, of Baltimore, ¹⁰⁴_{May 28} considers the cases of insanity that follow various acute and febrile conditions in three groups: those that result from shock, those that result from intoxication by specific poisons, and those that result from anæmia and nervous exhaustion. The first group includes cases of confusional insanity due to surgical operations, childbirth, the puerperal state, etc. There is usually a history of great mental strain or anxiety, sleeplessness, delirium, hallucinations of hearing or sight; delusions of apprehension, and often great mental disturbance. The insanity develops suddenly, as a rule, and runs a rapid course, generally terminating in recovery, but sometimes in chronic insanity, and even in death. The insanity dependent upon specific poisons includes the delirium of fevers, both intermittent and exanthematous; of pneumonia; of uræmia; the transient insanity of influenza; the mental confusion of multiple neuritis; the delirium of iodoform, salicylic acid, and chronic alcoholic intoxication; and the delirium of puerperal fever. Under these conditions there is produced an active delirium, which is self-limited and disappears with the removal of the exciting cause. The insanity resulting from anæmia and nervous exhaustion is to be regarded as the expression of an exhausted physical state. It is attended with delusions of fear and apprehension; hallucinations of sight and hearing; perversions of taste, of cutaneous sensibility; and frequently progressive stupidity and mental impairment. The treatment must primarily be prophylactic. Delirium is, as much as possible, to be prevented. The Brand method of treatment seems to exert a beneficial influence in this direction. Something also can be accomplished by rest, quiet, and nutrition. The patients under consideration should not sit up prematurely, should not early receive visitors, or be exposed to mental strain. For the treatment of the developed disease, rest, quiet, nutrition, hypnotics,

massage, good nursing, and careful personal attention are required. Asylum treatment is not to be recommended, unless imperatively necessary. The opinion is expressed that the term "post-febrile" should be restricted to those forms of insanity that follow exhausting diseases like enteric fever and the exanthemata. It should not be applied to the toxic conditions that give rise to prolonged delirium; neither is it to be replaced by the name "confusional insanity"; the latter term may be accurately employed to describe the forms of insanity that arise in the course of active diseases.

GENERAL TREATMENT OF FEVERS.

Bremner¹ recommends a hot-blanket pack in the treatment of the febrile condition. A blanket large enough to completely envelop the patient is folded twice lengthwise, then rolled up into a moderately tight roll. Two ounces (62 grammes) of good soap are, by boiling, dissolved in 2 quarts (2 litres) of water. The boiling solution is then poured into the centre of the ends of the roll of blanket, which is from time to time manipulated to facilitate its thorough saturation. Upon one-half of the patient's bed, or upon a cot by his side, is placed a sheet of rubber cloth, and upon this a large, dry, double blanket, so arranged that it may subsequently be made to completely and thoroughly surround the patient's neck. The patient is undressed, and has a blanket loosely thrown about him. All being in readiness, the roll is laid at the foot of the bed or cot, and quickly unrolled from below upward and spread upon the dry blanket. In a few seconds, in accordance with the degree of heat of the pack, the patient is placed upon the middle of the wet blanket, in which he is thoroughly wrapped, and over which the dry blanket is snugly applied. The blankets are well tucked in about the arms and legs. If the feet manifest a disposition to be cold, hot-water bottles should be applied. If the bedroom is cold, an additional blanket may be employed. It is well to apply an ice-bag to the head, or cloths wrung out of ice-water may be kept constantly applied to the temples. The patient should be generously supplied with cold water to drink. The pack should be continued for from one to two hours, according to the degree of temperature and the feelings of the patient. Children often fall asleep during the application. The temperature soon falls, and, if the patient has been delirious or comatose, intelligence

returns more or less completely. The pack should be repeated twice or thrice daily, until the temperature remains permanently below 101° F. (38.3° C.). On its removal, the patient should be gently rubbed with a soft towel and replaced upon the ordinary bedding.

Carter¹⁸⁷ has reported the case of a man, 31 years old, who was being treated for a condition not specified, but in which hyperpyrexia was not anticipated, and in which the temperature rose to 108.5° F. (42.5° C.). Consciousness was lost; internal strabismus was present; the pulse could not be counted; the face was full, red, and congested, and the skin was sweating profusely. It was agreed to strip the man, and apply in rapid succession cloths immersed in ordinary cold water until ice could be obtained, and to inject into the rectum 20 grains (1.3 grammes) of quinine sulphate and 1 fluidrachm (3.70 grammes) of tincture of digitalis in 2 ounces (60 grammes) of water. In an hour the rectal temperature had fallen to 104° F. (40° C.). As the temperature fell the man slowly became conscious and, after a few days, in which sleeplessness was a prominent symptom, and during which a second threatening rise of temperature required a second external application of cold, was quite well. Hopkins, of Milton, Del.,¹²¹ recommends, as an adjunct in the reduction of febrile temperature, that cold water be poured in a small stream from a height of one or two feet upon the wrist for a few minutes. Cadogan-Masterman²⁶ commends the employment of alcohol for the reduction of temperature. If the thermometer rises above 103° F. (39.44° C.), he gives spirit of wine—say, a drachm (3.70 grammes)—freely diluted, every two hours, or ½ ounce (15 grammes) of whisky, in the same way. The tongue may be taken as the index for the use of the agent. If it be dry, the alcohol should be given; otherwise it is to be omitted. The recommendation is based upon the view that the administration of alcohol diminishes heat-production by checking the combustion of the body-compounds of carbon and hydrogen.

INFLUENZA.

Etiology and Bacteriology.—Pfeiffer⁵⁷ describes specific bacilli found in pure culture in the bronchial secretion of uncomplicated cases of influenza. These organisms were frequently found in the protoplasm of pus-cells in great numbers. By careful control

observations they were found to be absent from the sputum of ordinary bronchial catarrh, pneumonia, and pulmonary tuberculosis. The bacilli had been observed for the first time during the epidemic of 1889-90. They may be stained by means of a warm solution of methylene blue, prepared according to the method of Loeffler, and by a weak Ziehl solution. They do not stain by Gram's method. The bacilli can be cultivated in agar-agar, but inoculations and further cultures are without effect, excepting in the case of apes and rabbits. The bacilli are small, encapsulated, and often found disposed in rows lying end to end. The extremities are more deeply stained than the intervening portion.

Weichselbaum⁸₁₁ differs from Pfeiffer in the results of his investigations, in so far as he has not been able to detect the deeper staining of the extremities of the bacilli. He ascribes the appearance described by Pfeiffer to the proximity of two of the minute bacilli, which gives the impression of a small diplococcus. He, however, agrees with Pfeiffer⁸₁₀ in his results as to cultures of the bacilli. Experiments with glycerin-agar, sugar-agar, animal broths, and blood-serum were unsuccessful. When, however, Pfeiffer's later method was followed, namely, the coating over of the surface of any one of the albuminous media with blood, the cultures were successful, even to late generations. In the examination of tissues Weichselbaum was able to obtain striking results, the only precaution necessary being to decolorize the sections until the protoplasm of the cells became almost colorless. Alkaline methylene blue and carbol-fuchsin were the agents used. The examination of the blood was negative. Weichselbaum accounts for the failure in the earlier epidemics to isolate the specific bacillus by the fact that the examinations were usually made in cases complicated by pneumonia and bronchitis. He suggests that the micro-organisms that were formerly taken for small diplococci may in reality have been the bacilli described by Pfeiffer. He asserts that the virus of influenza is more prone to produce lobar pneumonia than other pulmonary affections.

Pfeiffer and Beck,⁶⁹₇₀ in their later investigations, have noted the pathologic appearances of the lung in the pneumonia of influenza. Areas of broncho-pneumonia coalesce to form larger areas of consolidation, although general hepatization is absent. In the centre of such patches, on section, a yellowish-green, purulent

secretion may be expressed from the smaller bronchi. This secretion consists of pus-cells and mucus, and in it can be found the typical bacilli, sometimes free, sometimes within the cells. It was not possible to detect the bacteria in the blood. The bacilli are aërobic and are destroyed by drying. They are killed in five minutes by a temperature of 60° C. (140° F.). It is possible to produce, in apes, a condition similar to influenza in man by placing a little of the pure culture upon the mucous membrane of the nose.

Canon⁶⁶ found the specific bacillus present in the blood from twenty-four consecutive cases of influenza. The drop of blood, taken from the patient's finger, was brought in contact with a thin cover-glass, over which another was laid, both being suddenly pulled apart. The cover-glasses, after drying, were placed in absolute alcohol for five minutes; they were next placed in a coloring solution of the following composition:—

Concentrated aqueous solution of methylene blue,	40 parts.
Alcoholic solution of eosin (5 to 1000),	20 parts.
Water,	40 parts.

The specimens remained in this solution for from three to six hours at 36° C. (96.8° F.), and were then washed in water. In six cases Canon found the bacilli in preparations of blood in numerous large groups containing from three to fifty bacilli each. The blood was obtained in these six cases during the pyrexial stage or shortly after its decline. In three of the cases there was no further rise in temperature, and in six days no bacilli were to be found.

Kitasato⁵⁷ attributes the difficulty experienced by most observers in developing cultures of the bacilli found in the sputum to the contamination from the cavity of the mouth. The organisms of the mouth develop rapidly in artificial media and conceal the colonies of the specific bacterium, especially as the latter develops slowly. He calls attention to the possibility of recognizing the influenza bacilli by their proclivity to form in colonies that develop separately and never coalesce, a characteristic wanting in all other known forms of bacteria.

Babes, of Bucharest,⁶⁹ during the epidemic of 1889-90, isolated from the sputum of influenza patients a bacterium that presented the following characteristics: It was found in fresh cases

in unlimited numbers in the sputum and within the protoplasm of the leucocytes, forming a thick deposit upon the mucous membrane and penetrating within the lymph-spaces. This bacterium appeared in pairs, or as a short bacillus of 0.2μ in diameter, disposed in short chains. The bacilli were surrounded by a transparent zone and were non-motile. In old specimens and cultures and in the interior of leucocytes they were found in a condition of granular disintegration, sometimes smaller than usual and sometimes swollen to three times their usual size. It was possible to cultivate them in agar-agar and, by inoculation in rabbits, to produce a form of septic infection and a fatal pneumonia.

Cornil and Chantemesse¹⁰⁰ found that, twenty-four hours after inoculating a rabbit with blood from a child suffering from influenza, there were present in the blood of the rabbit bacilli that responded to the special method of staining. The organisms had a diameter of about one-twentieth of that of a red corpuscle. In cultures in sweetened gelose a transparent, opaline zone developed in twenty-four hours, presenting a finely granular appearance.

Pfuhl,⁵⁰ in nine cases of influenza, found the same organism in great numbers in the sputum, both outside of the cells and within them. As the fever subsided the number of bacteria apparently diminished. They stained according to the method described by Pfeiffer, and were cultivated to the eighth generation in broth from colonies on plate-cultures of glycerin-agar inoculated with sputum. In plate-cultures from the blood of one case a bacillus similar to that found in the sputum, but more delicate in form, was found by him. This bacillus was cultivated to the second generation. Rabbits inoculated with both bacilli from the sputum and bacilli from the blood showed signs of infection, but the first variety produced the most marked results.

F. J. Thornbury, of New York,⁵⁹ describes the bacillus of influenza as being one-half the length of the "septicæmia bacillus" and of equal thickness. It is best cultivated in sugar-agar (1½ per cent.), and is virulent to the fifteenth generation. The colonies appear as minute, watery drops along the streak of inoculation. In bouillon the bacillus grows scantily, and gives evidence of its non-motility by the fluid remaining clear. It cannot be cultivated in gelatin, because gelatin melts at the temperature necessary for the growth of the organism.

Incidence.—Ruhemann, of Berlin, ⁶⁹_{Nov. 20, '91} observed several sporadic cases of influenza early in September, 1891, in Berlin, and considers these as marking the beginning of the epidemic in that city for 1891-92. The disease appeared to attack women and children to a greater extent than in former epidemics.

Roberts ⁶_{Apr. 23} calls attention to the relation of influenza to meteorologic conditions, as shown in a series of meteorologic tables issued by the borough of Nottingham. These show that during the epidemic of ten weeks the barometric pressure was high, with a low and narrow range of temperature and a corresponding absence of rain and sunshine during the seven weeks preceding the outbreak of influenza. During the prevalence there was nothing remarkable in the climatic conditions, except an extreme range of temperature from a maximum of 72° F. (22.2° C.) to a minimum of 29° F. (-1.66° C.) during the period of the maximum death-rate from influenza and respiratory diseases. There was nothing unusual in the atmospheric pressure, rain-fall, or direction of the wind during the ten weeks in which deaths from influenza were recorded. From these tables, it also appears that the number of deaths from zymotic diseases was proportionately smaller as the epidemic increased, and that the number of deaths from diseases of the respiratory apparatus and in the old followed the course of the epidemic. The majority of writers place the period of incubation between two and six days. Kochmann, of Abenberg, ⁶_{June 11} has mentioned twelve hours as the shortest period, while Hennig, of Leipzig, ⁶_{June 11} has observed a case in which seventeen days intervened between the time of exposure and the onset of the attack. A. Alison ¹⁵²_{Sept. 20} reports a series of cases illustrative of the contagiousness of influenza. He observed that the disease spread in three ways: (1) directly by contact; (2) indirectly by means of the atmosphere vitiated by expirations from influenza cases; and (3) by objects that had been in contact with infected individuals. He states that the principal means by which the germs find entrance into the body is the mucous membrane of the respiratory and digestive tracts; possibly, also, by the vaginal and the conjunctival mucous membranes. R. Sisley ²⁶_{Apr. 1} records two instances of the spread of influenza from horses to attendants that had been in contact with the infected animals. He admits that, while such a mode of transmission is possible, it is not usual. He alludes, also, to the generally-accepted belief that

influenza among domestic animals is contagious from one animal to another. Ruhemann, of Berlin, ²⁰⁷¹_{p.116} inclines to the doctrine of contagion. He gives his own experience among 55 families, numbering 193 individuals. In 1889-90 there were 64 cases of influenza among this group, while in 1891-92 only 40 were attacked; and, what is of special interest, only 5 out of this number were affected (and that but slightly) two years before, while of the 64 then attacked only 4 again became victims. That one individual may suffer several recurrences during the prevalence of a single epidemic is not thought to militate against the general doctrine of protection, as many such recurrences may be explained by lack of caution on the part of patients against exposing themselves to fresh infection before they are fully restored to health.

Pathology and Morbid Anatomy.—Althaus, of London, ⁶_{p.113} refers to the results of a series of eleven post-mortem examinations made by Helweg. In every case intense hyperæmia of the pia mater at the base of the brain was present. The arteries were distended and the consistence of the brain and spinal cord was increased. It is believed that this hyperæmia is more than an evidence of a vasomotor disturbance, and that it points to the natural association between influenza and epidemic cerebro-spinal meningitis. This theory is suggested by the occurrence, in a large proportion of the cases, of pachymeningitis and leptomeningitis.

Ribbert, of Bonn, ⁶_{p.11} in describing the lesions of the respiratory tract, points out that the forms of pneumonia that accompany or follow influenza are somewhat varied. Often there is lobar pneumonia, in which the hepatization has, on section, a peculiar, smooth aspect, differing from the granular appearance of ordinary croupous pneumonia; or this condition may be commingled with areas of lobular hepatization; or the latter may alone be present. Again, in some cases, there is marked interstitial inflammation; a character that may account for the greater tendency to the supervention of abscess and pulmonary gangrene observed in influenza cases. Pleurisy is a frequent concomitant; while pericarditis and, sometimes, myocarditis have also been observed. The spleen is usually enlarged. There may be cloudy swelling of the kidneys, or even glomerulo-nephritis. Cerebro-spinal meningitis and cerebral abscess have been met with. The chief feature of the

morbid anatomy of influenza, however, is the inflammation of the respiratory organs, to which the mortality is mainly due.

Symptomatology and Diagnosis.—Hughes, of St. Louis, ⁹⁸_{Apr.} has observed a prolonged congestion of the vessels of the cerebro-spinal system among the salient features of the involvement of the nervous system in influenza. Early in the course of the disease, two-thirds of the cases in females exhibited spinal tenderness, while in males one-third presented the same symptom; the disease, therefore, is evidently not limited in its incidence to the medulla oblongata. Zenner, of Cincinnati, ⁵⁸_{Jan. 16} states that the mental symptoms of the febrile period are more likely to appear on the second or third day of the disease. They are mostly like those of the ordinary delirium of fever,—a semi-conscious, dream-like state, and a sense of restlessness, indicated by tossing about, screaming, singing, etc. There is usually disturbed sleep, and often the indications of hallucinations and delusions, and perhaps of an anxious, depressed mental state. The delirium may be of only a few hours' or of a few days' duration, but frequently it lasts a few weeks after all other symptoms have passed away, and may pass into the form of post-febrile insanity. Usually there is partial or complete amnesia of the attack. The prognosis of the nervous manifestations is generally favorable. The post-febrile psychoses may be of only one week's or of two weeks' duration, or even shorter, but they have an average duration of six or eight weeks, and sometimes continue for months. Rarely, cases do not manifest any tendency to recovery. Occasionally, a fatal termination ensues from exhaustion. Suicide sometimes abruptly terminates the clinical history.

Delmis, ¹⁰⁰_{Jan. 29} has observed præcordial distress, trembling of the muscles, vertigo, disorders of sight and hearing, even when the catarrhal inflammation has not extended to the conjunctiva or to the tympanum by the Eustachian tube. Otagia, as well as other forms of neuralgia, especially those affecting the ophthalmic branch of the trigeminal nerve, is of frequent occurrence. Hyperæsthesia and insomnia are common symptoms. It is held that the terms "encephalic form" and "nervous form" are unnecessary, as the symptoms included by them are common to almost every case.

Nevins, ⁶_{Apr. 16} attaches much importance to the affection of the naso-pharyngeal mucous membrane in influenza. He believes that, as a rule, the affection first attacks the mucous membrane, and

that the intense inflammation resulting therefrom accounts for the grave constitutional disturbance. In support of this theory, he cites the analogous mode of attack in diphtheria, and the intense cardiac and general enfeeblement that accompanies a hospital sore throat. Cooper, of Atlanta, Ga.,²⁰⁷ reports two or three cases of severe nasal congestion, with its characteristic symptoms, followed by marked relief upon the discharge of a large amount of secretion from the nasal and accessory cavities. This condition has also been observed by Glasgow, of St. Louis,²⁶⁴ who mentions the great increase in the number of cases of suppuration of the antrum during the influenza epidemic; also, the great prevalence of purulent and sanguineo-purulent discharge from the nostrils.

Robinson, of New York,¹ has observed the occurrence of severe and repeated attacks of epistaxis in the early stage of influenza, the hæmorrhage being so severe as to call for repeated plugging of the nasal passages. In one case under his observation the patient bled profusely, although there had been no history of previous epistaxis or nasal catarrh. He also calls attention to the sudden and extensive swelling of the tonsils. He cites the case of a child, about 3 years of age, that presented enlarged tonsils, without any follicular deposit. The enlargement was quickly followed by abscess of one tonsil, and, twelve hours later, by perforation of the tympanic membrane of the opposite side. Both ears were the seat of active suppuration for several days. As in scarlatina and other febrile disorders, the perforation of the tympanum was preceded by relatively slight pain of short duration.

Morton, of St. Joseph, Mo.,⁵⁶⁸ mentions hoarseness as often making its appearance at the beginning of the attack and constituting the most prominent symptom. It has, on the other hand, made its appearance late in the attack, and has frequently been so pronounced at this stage as to delay convalescence. Hoarseness, occurring at this time, has frequently persisted for many days and weeks, and sometimes for months. Laryngeal examination reveals hyperæmia and thickening of the mucous membrane lining the larynx and covering the true cords. The epiglottis is usually congested, and the distended vessels are perceptible on the laryngeal surface. The adductors and abductors are in perfect condition, so that the cords are easily approximated or separated at will, thus excluding paresis. The mucous membrane afterward be-

comes dry, and cough results. The pharynx and naso-pharynx are coincidentally affected, though not to the same degree as the larynx.

Anders, of Philadelphia, ¹⁹_{Mar. 11}, has, in the course of attacks of influenza, encountered clinical conditions resembling those of acute rheumatism; but, in these instances, he has found very little, if any, disposition for the trouble to move from one joint to another, and, as a rule, there were no cardiac complications. He has, however, met with cases, although infrequently, in which, although the joint symptoms were absent, cardiac murmurs were present. He believes that these are not due to valvulitis, but to an altered condition of the blood.

Da Costa ⁹_{Jan. 1} has observed, as one of the most curious features of the epidemic of 1891-92, the prevalence of cases that, at first glance, seem mild cases of rheumatic fever. The joints, especially the wrist-joints, were extremely painful, only very slightly swollen, and doubtfully redder than normal; with the pain, which was great, there was some tenderness. The temperature usually ranged between 100° and 103° F. (37.77° and 39.44° C.). The rapidity of the pulse which accompanied this manifestation disappeared, together with the short cardiac murmur that was present in most cases. These murmurs are not considered as the result of an endocarditis, but as functional in character. Herzog ¹⁵⁸_{Feb. 14, 1892} states that, although in general the epidemic of 1891-92 was less intense among children than the preceding epidemic, the gastric symptoms which previously prevailed had been replaced by catarrhal symptoms of marked severity. Bronchial catarrh followed by pneumonia has been frequently observed.

A. Thompson, ⁶_{Feb. 12} contrary to his experience among adults, observed that in children the bronchial catarrh was usually unaccompanied by broncho-pneumonia, and that capillary bronchitis was notably absent. Later in the course of the disease the cough assumed a paroxysmal type, and, as in pertussis, was followed by vomiting.

Fürbringer ³¹_{Mar. 17} reports two cases in which death occurred, in the course of influenza, as a result of grave organic lesions of the cerebrum. In the first case the general symptoms were complicated by those indicative of some central nervous lesion: cephalalgia, anæsthesia, and right hemiplegia, with convulsions of the

face and extremities. The symptoms of the second case were equally typical. In both cases the autopsy revealed capillary emboli and hæmorrhagic foci in the lobes of both hemispheres, involving the white and gray substance. This observation coincides with the tendency to extravasation in various organs, notably the mesentery and the intestines. These conditions are accounted for by alterations both in the blood and in the vessel-walls.

Complications.—Huchard, of Paris, ¹⁹_{Apr. 16} speaks of the association of various microbes found in influenza, and considers that the troublesome and complex pathology of the disease is due to this fact. This association is particularly evident in the pneumonic form of the disease. There are thus congestive pneumonias, inflammatory pneumonias, and suppurative pneumonias; those produced by pneumococci and those caused by streptococci. In influenza the virulence of all micro-organisms seems raised to the highest degree. This fact explains the frequency of secondary infections giving rise to the various complications and sequelæ.

Rendu, of Paris, ¹⁷_{Dec. 17, 18} has noted the insidious progress of influenzal pneumonia. There is at first no shortness of breath or expectoration; suppuration appears, however, very rapidly. Kebler ²²⁶₁₈₈₈ mentions a peculiar symptom occurring in pneumonia complicating influenza. He states that he has frequently seen the disease begin with a distinct hæmorrhage, to account for which he could find no evidence of any lesion in the lung. Fever and cough supervene in from six to twelve hours after the hæmorrhage.

Guttmann ⁶⁹_{Mar. 17} has observed two cases of tachycardia in the course of influenza. One was in a male 40 years old; the attack occurred in five paroxysms, accompanied by dyspnoea, the frequency of the pulse reaching 120. The patient suffered from a relapse, in which the same symptoms appeared. In the second case—that of a woman of 28 years—the pulse reached 140, and continued at that rate for five days. Both patients recovered.

Lykke ⁶⁸_{Sept.} mentions several cases of mental and nervous diseases that were seriously complicated by influenza. Two patients that, after apoplectic attacks, had regained the full use of their limbs, became again paralyzed and imbecile after attacks of influenza. They recovered slowly, after a year or more. A patient suffering from a combination of posterior spinal sclerosis and

general paralysis became quite deranged mentally after an attack of influenza, but recovered; a similar result was observed in a tabetic patient. Judson Daland, of Philadelphia,¹¹² states that many cases of influenza might properly be included under the "nervous variety," presenting delirium, and at times more or less persistent hallucinations, double consciousness, etc. The severe pain in the extremities so frequently present is associated with more or less tenderness on pressure, justifying the suspicion of neuritis.

Curtin, of Philadelphia,¹³⁹ states that more deaths have resulted from meningitis than from heart-failure, in the course of influenza. Althaus⁶ Nov. 14, '91 writes: "*La grippe* also seems occasionally to revive an old syphilitic affection which has lain dormant in the system for years, and thus indirectly to give rise to certain diseases of the spinal cord, which are known to occur habitually on a syphilitic base."

Fiessinger⁵⁵ Jan. 3 reviews the observations of Albespy upon the aural complications of influenza. The ear may be affected in any of its parts; subacute otitis is the most usual form of disease; the labyrinth is also a frequent seat of affection, the disease spreading from this centre to either the middle ear or to the mastoid cells. Albespy has reported two cases in which deafness followed labyrinthine disease. Clarke² Jan. 4 states that, with the exception of the ordinary catarrhal ophthalmia present in many cases of influenza, the ocular troubles have been mostly due to a lowering of the vitality of the system, and hence might be classed as neurotic. The three commonest eye-complications have been: (1) conjunctivitis, generally appearing during the attack; (2) corneal ulceration, generally appearing at the end of the attack; (3) asthenopia, manifesting itself mostly during the convalescent stage. The conjunctivitis was accompanied by a good deal of photophobia, but not, as a rule, with much discharge. Phlyctenular and simple keratitis, kerato-iritis, and herpes of the cornea have all occurred, but simple ulcer has been the commonest affection. A severe case of iritis and cyclitis following influenza was observed. Affections of the more important regions of the eye, such as optic neuritis, optic atrophy, retinitis, glaucoma, etc., have all occurred, but have been rare. Paralysis of the intrinsic and extrinsic muscles of the eye occurred, reminding one of the same troubles

seen in diphtheria, and pointing to the presence of some poison in the blood. Asthenopia was the commonest complication. It sometimes showed itself during the attack, but chiefly during convalescence, or sometimes later. A large number of patients complained of eye-strain for the first time after an attack of influenza. These were mostly cases of premature presbyopia; others had no refractive defect, and their asthenopia was of the neuropathic type, allied to the neurasthenic asthenopia, and often manifesting itself in those recovering from a long illness. As a result of the lowering of nerve-force, which is such a characteristic symptom of influenza, the ciliary muscle is less able to stand fatigue, and, to avoid the asthenopia, many persons have been compelled to use glasses earlier than usual. Muscular asthenopia due to the strain of convergence figures prominently as a sequel of influenza; and retinal asthenopia, diagnosed by the concentric contraction of the field of vision, has often been seen. The prognosis has been good; almost all of the cases, in time, have recovered. There has been no relation between the severity of the attack of influenza and the ocular trouble. The treatment consists chiefly in rest and tonics, the local trouble being treated by the usual remedies. For the asthenopia, weak, convex lenses should be ordered.

Max Thorner, of New York,¹⁵⁰ reports a case of influenza in which a deposit of oïdium albicans occurred in the nose and pharynx. The patient was a male, 17 years of age, who, during the latter part of an attack of influenza, was seized with profuse bleeding from the nose. He was prostrated by the loss of blood, and, during recovery from this sudden epistaxis, he began to complain of dryness and soreness of the mouth. An examination of the tonsils revealed a deposit similar to that occurring in follicular tonsillitis. This deposit spread, until it formed a pronounced membrane, covering the tonsils and pharynx. The nasal cavities finally became affected. It was evident that this membrane was of mycotic origin. Examination revealed the mycelium and spores of the oïdium albicans. The deposit, in its extension, involved the entrance to the Eustachian tubes, occasioning deafness and a sense of fullness and throbbing in the ear.

Pantzer, of Indianapolis,⁵⁶ reports a case of abdominal section for removal of the uterine appendages, in which the patient progressed without unfavorable symptoms until the seventh day,

when she was exposed to the contagion of influenza. On the ninth day there developed pain in the right side of the chest; dullness, affecting the lower and middle lobes of the right lung; severe cough, and rusty expectoration. The pulse was 127; the temperature, 104° F. (40° C.). Pneumonia was diagnosed. At this time the open surface at the lower angle of the incision began to discharge pus. There were no pelvic symptoms, but the patient rapidly failed in strength, and death occurred from cardiac failure on the thirteenth day, after resolution in the lung had fairly begun. Corresponding with the improvement in the condition of the lungs, the amount of pus secreted by the wound lessened, and ceased entirely during the last twenty-four hours of life. Lemière, of Belgium,²²⁰_{Sept. 23} cites a case of intercurrent pneumonia, complicated by an intra-muscular abscess in the abdominal wall, and extending into the crura of the diaphragm. The pus present, when treated by the method of Ribbert and Thost, was found to contain the diplococcus pneumoniæ. An examination of the wall of the abscess showed a deeply-stained zone of limitation, containing diplococci grouped between the infiltrating cells and included—to the number of five or six in some instances—within the cells. It is believed that the suppuration resulted from the invasion of the diplococcus pneumoniæ, but was limited by the intense process of phagocytosis.

Lache,³_{July 11} alludes to the absence of observations upon the appearance of thrombosis complicating influenza. He has noted the appearance of this condition in pneumonia, articular rheumatism, and chlorosis, as well as a sequel of enteric fever and of the puerperal state. He has observed a tendency in influenza for thrombosis to occur more frequently in females than in males, in the ratio of 4 to 1.

Fiessinger⁵⁵_{Sept. 24} calls attention to the occurrence of parotiditis coincidentally with influenza. The inflammation appears to be due to a secondary infection, and is not allied to mumps. It was observed, however, that cases of mumps appeared in the same patient some weeks after the earlier attack, and that individuals that came in contact with influenza patients suffering from parotiditis as a complication were also affected with a similar enlargement of the parotid gland, but unassociated with any other symptoms of influenza. The inflammation has appeared at the outset of the attack,

more rarely in the course of the malady, and has ordinarily disappeared by resolution.

Boudet, of Lyons, ¹⁸⁹⁶ reports a case of symmetrical gangrene of the lower extremities occurring in a tuberculous patient suffering from influenza. A pathologic examination established the absence of embolus or arterial disease, and the occurrence of gangrene is attributed to a thrombus of infective origin consecutive to influenza, while the symmetry of the lesion is ascribed to arterial spasm of central origin analogous to that occurring in Raynaud's disease.

Labadie-Lagrave ²¹ disputes the theory that abortion and premature labor in influenza depend upon mechanical irritation from coughing and hyperæmia, with local congestion. Many patients abort before the cough develops, and many others resist the tendency to miscarriage, notwithstanding an unusual rise in temperature, although in influenza most authorities admit the fact of a general tendency to local congestion, and especially to metrorrhagia. It is believed that the cause of the abortion in such cases is infection from the uterine mucosa. In proof of this two cases are cited. The first was that of a girl of 19 years, of tuberculous diathesis, who was admitted to hospital suffering from broncho-pneumonia. On the eleventh day she aborted. Three days after confinement phlegmasia alba dolens developed, followed on the fifteenth day by pyæmic abscesses in the sternal region.

Sequelæ.—Mills, of Philadelphia, ⁵⁸ classifies the organic nervous lesions occurring in the wake of influenza in the following order: neuritis, meningitis, myelitis, and cerebritis. He considers no single affection so common as neuritis, occurring in every form as to location and diffusion. He has observed the combination of multiple neuritis with poliomyelitis. Isolated neuritis of almost every cranial nerve has been recorded, with such resulting conditions as optic atrophy, loss of smell and of taste, ophthalmoplegias (both internal and external), oculo-motor, facial, and bulbar or pseudobulbar palsies of various types, including true pneumogastric paralysis. Several cases of specially-located affections of the sympathetic ganglia or nerves have been recorded. Of the forms of local neuritis most common may be mentioned the supra-orbital, intercostal, sciatic, and plantar. Althaus, of Lon-

don, ²²_{Aug.} includes the psychoses following influenza among the other well-known post-febrile psychoses; he believes that they are more common after influenza than after other fevers. The only acute disease that could at all compare with influenza in this respect is enteric fever. Predisposition is found to be present in 72 per cent. of the cases; but attention is called to the circumstance that this influence is often exaggerated. Alcoholism was present in 11 per cent. The duration of post-influenzal psychoses was as follows: 12 per cent. recovered in a week, 32 per cent. within a month, and 56 per cent. lasted beyond a month. The termination was as follows: 7.6 per cent. died, 56.6 per cent. recovered, 35.8 per cent. remained uncured. Corner ²_{Aug. 20} states that in forty cases of post-influenzal insanity that he had observed, about half were melancholic and half maniacal. There was a distinct class, in which confusion was the chief mental symptom. Neurotic inheritance was very common. He found that almost any nervous symptom might follow influenza; for example, cephalalgia, trigeminal neuralgia, insomnia, loss of memory; tremors of face, tongue, and limbs; tremulous and hesitating speech, epileptiform seizures, syncopal attacks. Symptoms of peripheral neuritis were also said to occur; for example, paræsthesia, neuralgic pains, and changes in the reflexes; inequality of the pupils was also noted in one case of post-influenzal insanity. All of these symptoms might occur in general paralysis of the insane, and might also complicate simple influenzal psychoses. The difficulty in diagnosing cases of ordinary insanity following influenza, when complicated by other nervous symptoms, and general paralysis of the insane, is great. Richards ²_{Aug. 20} states that, in his study of 1141 cases of influenza among insane patients, in no single instance did he find that the type of the mental disease had changed. In the cases of recurrent mania, in which the patient was fairly quiescent, an attack of acute insanity did not supervene. He is of opinion that influenza as a cause of mental disease has been much exaggerated.

Longuet, ³_{July}, in discussing the pathology of nona, refers to the views of Tranjen, who believes that he has, in the three cases studied by him, found an infectious cerebro-spinal meningitis, the result of influenza, and dependent upon the same cause (the pneumonia coccus). He also alludes to acute hæmorrhagic poliomyelitis as the pathologic basis of the affection.

McCarthy, of London,⁶ reports a case of chorea following influenza. Three weeks after the subsidence of the attack of influenza the patient developed choreic movements, beginning in the fingers of the right hand. In a short time the muscles of the arm became affected, and, finally, the muscles of the face. The movements of the arm were so violent that it became necessary to control them by force. The movements ceased on the twelfth day, and the patient succumbed to exhaustion on the seventeenth day.

Oddo,⁴⁶ in a study of post-influenzal spasmodic cough, observed that this symptom is more frequent in women than in men, and that it is more often found in children than in older persons. He argues from this that a cough of this origin arises in those whose nervous system is most susceptible; in other words, an antecedent neuropathy is the condition most favorable to the establishment of the affection, the nervous susceptibility being exalted by the effects of the influenza. In the treatment of the cough he advocates the employment of the nervines, especially antipyrin.

Treatment.—Ayer, of Boston,⁹⁹ advises inhalations of oxygen in the acute pulmonary affections of asthmatic type occurring in influenza.

Mueller, of Yackandandah, Victoria,²⁶⁷ recommends mercuric chloride, in doses of from $\frac{1}{2}$ to $\frac{1}{8}$ grain (0.0032 to 0.004 gramme) every two hours. He has never produced salivation by this treatment. He discontinues the mercury upon the appearance of intestinal irritation. Hare, of Philadelphia,⁸⁰ advocates, in the early stage of the disease, when the fever is marked, a fever mixture containing tincture of aconite, spirit of nitrous ether, and a solution of potassium citrate. Watson and Curtin, of Philadelphia,⁵ recommend salicin, on account of its tonic properties, the large doses in which it can be given with safety, and the almost immediate results, in most cases, in reduction of temperature. According to these observers, it also appears that the early use of salicin is followed by fewer relapses than occur after the use of other remedies. They assert, however, that it is by no means a specific in the sense in which quinine is a specific in malaria. Isclin⁸⁷⁸ recommends creasote in large doses. He administers it in pill form, each pill containing 0.05 gramme ($\frac{1}{4}$ grain), and the dose ranging from 20 to 25 pills daily. He advises inhalations of

creasote in the rhinitis and laryngitis that are likely to occur in the course of the disease. Hodgdon,¹⁰⁴ who attaches great importance to frontal headache as a symptom, prescribes the following as a remedy for this:—

R Phenacetini,
 Saloli, ʒʒ gr. xxx (2.00 grammes).
 Ergotini, gr. xij (0.78 gramme).
 M. et div. in capsule no. xij.
 Sig. : One capsule every three hours.

Hutchinson⁴⁶¹ attaches great importance to the administration of phenacetin to prevent severe neurotic symptoms, especially insomnia. He considers the tendency of the drug to produce extreme diaphoresis a disadvantage, and for this reason usually combines it with quinine. He has also obtained good results from a combination of hyoscine and camphor. Cooper,²⁰⁷ of Atlanta, Ga., recommends the following pill as a sedative:—

R Phenacetini, gr. v (0.324 gramme).
 Pulv. opii, gr. ss (0.032 gramme).
 Camphoræ, gr. ʒʒ (0.0023 gramme).
 Pulv. ipecac., gr. ʒʒ (0.0013 gramme).

Sachs, of New York,⁴⁵⁰ advocates, for the delirium of inanition and allied states, subcutaneous injections of morphine and atropine. The insomnia can be combated by prolonged warm baths, or, if necessary, by sulphur and paraldehyde. Cutter, of New York,⁷⁰⁰ recommends sulphur by inhalation, and menthol, either in solution or by inhalation, for the bronchial catarrh of influenza.

ENTERIC FEVER.

Incidence.—Von Fodor,⁹⁹ of Budapest, has reported the occurrence of an epidemic of enteric fever, in a Hungarian community of 34,000 inhabitants, living on the side of a mountain, in which 1228 persons were attacked and 93 (7.5 per cent.) died. Forty per cent. of the cases occurred in young persons. Although a small number of cases of enteric fever occurred each year, there had been no epidemic for twenty-three years. The preceding summer had been hot and dry. Late in October there was a copious fall of rain. Cases of enteric fever began to accumulate in the first week of November; the number became greatly increased in the second and third weeks, but thereafter rapidly declined, remaining, however, larger than usual. In the second week of the following

February, after the melting of the snow upon the surface, the epidemic again broke out with renewed violence, and continued for several weeks longer, gradually and finally subsiding. The water-supply of the greater portion of the community was brought from a mountain-spring, through pipes of primitive and defective construction. The remainder used wells. Drainage was carried off at the surface. Privy-wells were universal. It was soon observed that only that portion of the community was attacked that used the water brought from the mountain-spring, while that portion that used the water from the wells escaped. The people were instructed to boil all water intended for use, and in this way the magnitude of the epidemic was in some degree held in check. Although bacteriologic examination, made at the close of the first part of the epidemic, disclosed the fact that the well-water contained fewer bacteria (78 colonies to the cubic centimetre) than that brought to the infected portion of the town (61,747 colonies to the cubic centimetre), no typhoid bacilli were found. Subsequently, this latter number became much smaller. In the middle of February bacteria were again found present in enormous numbers, and soon afterward the second part of the epidemic occurred. Now it was possible by culture to find a number of bacilli the characteristics of which, in all essentials, agreed with those of typhoid bacilli.

Guimbretière, of Boussy, ¹²⁷_{May 12} has reported the occurrence of an epidemic of enteric fever, in the course of which eighty-five persons were attacked and thirteen died. All but two of the affected persons had partaken of water obtained from a well connected with the church in the village. On examination, the water was found to be chemically impure and to contain typhoid bacilli. The two exceptional cases had assisted in the nursing of other persons suffering from enteric fever. The husband of one of these developed enteric fever six months later, after the epidemic had subsided, at a time when there were no other cases of the disease in the village. The source of contamination of the well was obscure. The so-called well, however, proved to be but a cistern, into which the rain-water and some overflow water percolated. The church itself occupied the site of an old cemetery. It was known that in the winter preceding the occurrence of the outbreak there had been a sudden thaw, numerous fissures forming in the ground;

and it is thought that the noxious matters were thus carried into the well from which the disease-breeding water was obtained. Reid ²_{Apr.} has reported the occurrence of seven cases of enteric fever in persons, of whom six came into relations with a farm, in the house on which, a year previously, there had been a case of enteric fever. All drank of water obtained from a well in close proximity to the privy-well, into which had been thrown the dejecta of the patient of the previous year. The view is expressed that the sudden outbreak was the result of renewed vitality on the part of the specific cause of the disease, and not of evolution.

Egbert, of Philadelphia, ¹¹²_{May} has reported the results of an investigation of an epidemic of enteric fever, in a small manufacturing community of 300 inhabitants in the southern portion of North Carolina, in the course of which 53 persons were attacked and 10 died. There had been no cases of enteric fever in the community prior to the advent of a family that came to find employment, one member of which was ill, probably with enteric fever; soon afterward the epidemic broke out. Inquiry showed that no special provision was made for drainage. There were no cess-pools, privies alone being used; the solid excreta being removed at monthly intervals. The water-supply was obtained from wells. The soil of the village was porous. The epidemic was brought to an end by boiling the water intended for use, and subsequently providing a water-supply obtained from a source free from the suspicion of contamination, with the reception of the dejecta into tightly-closed boxes, which were removed and emptied twice a week.

Caton, of Liverpool, ²_{Nov. 28, 91} calls attention to a possible means of dissemination of enteric fever from the employment of liquid manure obtained from cess-pools in the cultivation of lettuce, celery, and allied vegetables.

Mitchell, of Cincinnati, ⁵³_{May 14} has reported the occurrence of twelve cases of enteric fever in persons who had drunk milk from a common source, four of the cases being in members of the family of the dairyman from whom the milk was obtained, and who, it was known, diluted the milk with water. At the dairy, the milk-cans were washed with water obtained from a well near a stable. Two of the sick men had been cared for by men who assisted in the milking. Turner ¹⁵_{Aug.} has reported the occurrence of

an epidemic of enteric fever, the origin of which could not be traced to the milk-supply or the water-supply. Inquiry, however, elicited the fact that all of those that were attacked were in the habit of eating ice-cream obtained from a number of itinerant Italian vendors, in the families of some of whom the disease likewise appeared; while all that took no ice-cream escaped. It could not, however, be ascertained by what agency—whether by milk, or ice, or water—the infection was transmitted.

While admitting that, in perhaps 90 per cent. of cases of enteric fever, the specific infection is transmitted through water, Sicard,³ maintains that, in the remainder, the transmission occurs through the air. By having patients with enteric fever breathe several times for several minutes through curved tubes into water that had been boiled and sterilized, keeping this fluid for forty-eight hours at the temperature of the body, and inoculating various culture media, it was possible to demonstrate the presence of typhoid bacilli in the air expired. The conviction is also expressed that the bacilli thus exhaled may be inspired by other persons, finding lodgment in the air-passages and being taken up thence into the blood-current.

Etiology.—Arloing²¹¹ has reported the results of a study of the bacillus coli communis and the bacillus of Eberth made by Rodet, Roux, and Vallet. In an examination of the water of a community in which one hundred and nineteen of two hundred and fifteen persons were attacked with enteric fever Rodet found an organism that possessed almost all of the characteristics of the bacillus of Eberth, both in cultures and on microscopic examination. Cultivated for several generations and upon different media, the organism presented a polymorphism, in consequence of which it sometimes resembled the bacillus coli communis and at other times the bacillus of Eberth. Examination of two other waters used by communities in which enteric fever was prevalent disclosed the presence of organisms that resembled the colon bacillus more closely than the bacillus of Eberth. Roux made a corresponding observation. Rodet and Roux now studied the stools of a number of enteric-fever patients, and found some cases in which only the colon bacillus was present in the stools, and other cases in which the bacillus of Eberth was found in the spleen and the colon bacillus in the intestines. It was not possible to make a dis-

inction between the two organisms, from a study of their morphology, biology, or pathogenicity. Rodet and Roux found that an old bouillon culture of the colon bacillus presented, in culture upon potatoes, the delicate film described as characteristic of the bacillus of Eberth, while the bacillus of Eberth obtained from the spleen presented a coarse growth like that of the colon bacillus. Colon bacilli from old cultures did not stain more readily than the bacilli of Eberth. The bacillus coli communis may, like the bacillus of Eberth, decolorize gelatin that has been stained with fuchsin. The bacillus coli communis, when kept in the presence of carbolic acid or when passed through guinea-pigs, may be as actively motile as the bacillus of Eberth. Both organisms are subject to variations in form and size. The bacillus coli communis could be made to resemble the bacillus of Eberth by keeping the culture for some time, by heating the organism at a temperature of 176° F. (80° C), and by cultivating it at a temperature of from 111.2° F. (44° C.) to 114.8° F. (46° C.). Roux found, in the rose-spots of a case of enteric fever, an organism that in culture presented an appearance intermediate between that of the colon bacillus and that of the bacillus of Eberth. The conclusion is arrived at that the bacillus coli communis and the bacillus of Eberth represent two species of the same organism, and that the human economy favors the transformation of the colon variety into the Eberth variety. Vallet has observed that the colon bacillus survives longer and multiplies more rapidly in the stools than does the bacillus of Eberth. Rabbits, to which were given water soiled by faecal matter, resisted inoculation with cultures of both the bacillus of Eberth and the colon bacillus.

Petruschky⁵⁸_{Aug. 30} has studied anew the question of the action of the bacilli of enteric fever upon lower animals, and has found that it is not truly pathogenic, in the sense that inoculation with small quantities is followed by enormous multiplication; it is, however, possible, by subcutaneous and intra-peritoneal injection of definite quantities of bacilli, to induce illness in the animals and to cause fatal intoxication. Bacilli of enteric fever, introduced into the peritoneal cavity in numbers not too small, may multiply quite considerably upon the serous covering of the abdominal viscera. Multiplication in the texture of organs was, however, not observed. It could not be definitely determined whether the

formation of toxic matters took place only in the body of the animal or in the cultures as well. The appearance of symptoms immediately after the injection is suggestive of the formation of the toxic matters in the culture.

In addition to marked leucocytosis, Thoinot and Calmette³⁰²_{no. 1} found in the blood obtained from the finger-tip and from the spleen, in a large number of cases of typhus fever during an extensive epidemic, a large number of micro-organisms appearing as refracting granules 1 or 2 μ in diameter, with processes from 3 to 5 or 10 μ long, and terminating in small swellings, suggestive of spores. The organisms are actively motile, and move about like the spirocheta of relapsing fever. At the end of several hours the processes increase in length and assume a spiral outline.

Immunity.—Stern, of Breslau,⁶⁹_{Sept. 15} has made a study of the blood-serum in seven cases of enteric fever. The questions that he endeavored to solve were: 1. Is the bactericidal activity of the blood to the typhoid bacillus increased in persons that have recovered from enteric fever? 2. Has the blood of such persons any curative action upon animals inoculated with typhoid bacilli? 3. Has this blood the property of neutralizing the poisons generated by the typhoid bacillus? In the cases studied the blood was examined at various intervals after convalescence had set in: a week and five and a half weeks, respectively, after the last day on which fever had appeared; in another on the fourth, in a third on the sixth, afebrile day; in a fourth, five days, in a fifth case, a week after defervescence; in a sixth, on the fifth afebrile day; and in the seventh patient, who was under treatment for alcoholic neuritis, the attack of enteric fever had occurred seventeen and a half years before. It had previously been demonstrated that the human blood (defibrinated blood or blood-serum), as well as the fluid found in exudates and transudates, possesses the property of destroying typhoid bacilli. No difference was found to exist between the blood of patients suffering with an attack of enteric fever and the blood of healthy persons. It was found that, in five of the cases that had recently recovered, the bactericidal activity of the blood-serum to typhoid bacilli was distinctly diminished; no variation from the normal activity was found in the blood-serum of the patient that had had an attack seventeen and a half years previously. White mice, treated with a mixture of typhoid bouillon

and the serum of a healthy person, succumbed after the same interval as animals treated with the same quantity of typhoid bouillon alone, while mice treated with a mixture of typhoid bouillon and the blood-serum from four of the cases recently convalescent from an attack of enteric fever survived; in one case the animals died, but death was notably deferred; in the sixth case, and in that in which the disease had occurred seventeen and a half years previously, no influence upon the fatal termination was observed. It was demonstrated that an otherwise lethal quantity of a sterilized extract of typhoid cultures could safely be injected into animals, in the proportion of 1 to 1 or of 1 to 2, if the extract were mixed with the blood-serum from three of the recent convalescents.

Morbid Anatomy.—Hervouët¹²⁷_{July} has reported the case of a woman who had presented symptoms of enteric fever for several days. Convalescence set in apparently early, when suddenly dyspnoea developed, the temperature rose, pain in the abdomen appeared, and death soon followed. At the post-mortem examination numerous Peyer's patches in process of cicatrization were found in the small intestine; no ulceration was present. The large intestine, on the contrary, presented a large number of ulcers. The spleen was enlarged and diffuent; the liver was large and fatty; the kidneys were also large. The lungs were congested in places, in other places presenting areas of broncho-pneumonia; at the apices were the cicatrices of ancient tuberculosis, but nowhere were there recent tubercles. The opinion is expressed that the primary infection involved the small intestine, the process in the large intestine being secondary. As a result of a careful study of the peculiar nodules that develop in the liver in the course of enteric fever, Moroni⁴⁶⁰_{Nov.1}⁴¹_{Aug.1} concludes that they are produced by the bacillus of enteric fever, which may occasion a coagulation necrosis, affecting the protoplasm of the cell, the nucleus escaping; or a collection of movable cells, intermixed with the detritus of nuclei; or a perilobular infiltration of movable cells; or pyogenetic manifestations.

Clinical.—Mason, of Boston,⁹⁹_{Apr.7,14} gives the statistics of 676 cases of enteric fever admitted to the Boston City Hospital during the years 1890 and 1891. Seventy cases terminated fatally—10.4 per cent. The largest number of cases were admitted in the months of September (165), October (139), and August (97). The largest

number of cases occurred in persons between 20 and 25 (207, with 25 deaths—12 per cent.), between 25 and 30 (137, with 9 deaths—6 per cent.), and between 15 and 20 (120, with 13 deaths—10.8 per cent.). The mortality was lowest in children and highest in persons older than 30. The later that the patient came under observation, the more unfavorable was the course of the case. Fifteen patients died within three days after admission to the hospital. Of the total number, 445 cases were in males and 231 in females. Of the males, 43 (9.6 per cent.) died; of the females, 27 (11.6 per cent.). Intestinal lesions, perforation, and hæmorrhage were more commonly the cause of a fatal issue in males (4 per cent.) than in females (2.6 per cent.). Intestinal perforation occurred in 9 cases, of which 6 were in males and 3 in females. Hæmorrhage from the bowels took place in 32 cases, of which 25 were in males and 7 in females; 14 of the cases terminated fatally. There were 7 cases of pulmonary tuberculosis, all of which terminated fatally. Pneumonia appeared in 34 cases; in 28 recovery took place; in 6 death. Eleven cases were complicated by pleurisy; 3 terminated fatally. Bronchitis was present as a severe symptom in 74 cases, in 2 determining a fatal issue. Pulmonary œdema was present in a marked degree in 25 cases, of which 10 terminated fatally. Albumen and tube-casts appeared in the urine in 60 cases: in 3 of these there was chronic nephritis, which led to a fatal termination; in 12 others that terminated fatally there was acute nephritis. There were, besides, many cases of febrile albuminuria. In 12 cases there was chronic valvular disease of the heart; death took place in 2. Two cases presented acute endocarditis; death took place in 1. One patient had acute fibrinous pleuritis and pericarditis and acute nephritis. Diarrhœa was present in about half of the cases, but was the chief cause of exhaustion in only 5. Hyperpyrexia was noted in but 3 fatal cases, 2 of which were in males and 1 in a female. The highest temperature recorded was 108° F. (42.2° C.). Alcoholism was one of the gravest sources of danger in a large number of cases, and was no doubt responsible for many of the cardiac, renal, and pulmonary complications that contributed to fatal exhaustion. Delirium tremens was present in 8 cases, of which 5 terminated fatally. Of 2 cases of parotiditis, death took place in 1. Pregnancy existed in 7 cases: in 4, recovery ensued without abortion; in 1, abortion

occurred at seven months, the child living and the mother recovering; in 1, death resulted from pneumonia, without the occurrence of abortion; in 1, a fleshy mole existed and septicaemia developed and perforation occurred. Thrombosis of the iliac or femoral vein was observed in 19 cases, in 4 of which death took place; in 2 from consequent embolism of the pulmonary artery, and in 2 from exhaustion. Peripheral neuritis occurred in 21 cases. In 2 post-typhoid insanity developed. Purulent otitis was recorded in 22 cases. Symptoms of appendicitis were present in 1 case, which ended in recovery. Relapses took place in 100 cases; in 3 cases, there were 2 relapses; in 2 cases, 3 relapses. Four deaths occurred in relapses. In 35 cases the initial pyrexia did not fall to the normal for thirty days or more, and in 9 cases it continued without subsiding for more than forty days. The treatment consisted principally in cold sponging and affusions, with the internal administration of antipyretics, antiseptics, and tonics, and the employment of such other dietetic, stimulating, and symptomatic measures as the individual case seemed to require. In conclusion, a preference for hydro-therapeutic measures is expressed, of which the full bath of Brand is considered to be the most efficient and convenient.

Moussous ²⁵ _{No.4;} ¹¹⁸ _{July;} ² _{June 4} reports the observation of 50 cases of enteric fever in children under the age of 15 years, of which 3 died. Cinchonine, quinine, purgatives, repeated every second day until the twelfth day, enemata night and morning, and a generous milk-diet constituted the treatment. Naphthol was administered to children capable of swallowing tablets. The graduated cold bath was reserved for cases attended with nervous manifestations or with hyperthermia. In 1 child, previously in apparently perfect health, the attack set in with great abruptness. In 2 cases the onset was attended with vomiting, which persisted for eight or ten days; in 2 others, gastric symptoms were prominent, with absolute anorexia. In 3 cases the type of the disease was ataxic. One child, 4 years old, developed a spleno-typhoid. In 2 cases grave syncopal symptoms appeared; recovery occurred in both. One child died on the twentieth day (convalescence having almost set in), in consequence of attempting to rise to drink a cup of milk; at the autopsy the cause of death remained undetected. Among the complications were: phlegmasia alba dolens in a fatal case in

a child of 2 years; great dilatation of the colon in a boy of 9 years; neurasthenic symptoms in a girl of 13 years, of neurotic tendencies. Relapses took place in 5 cases. Comparatively, although the febrile movement was higher, the symptoms were less alarming, and the grave complications less common, than in adults. The disease was more severe in children under 2 years old than in older children. The explanation of this and of the other fact, that enteric fever is relatively milder in children than in adults, lies in the less rapid development of the typhoid bacilli in the intestines, on account of the activity of the digestive functions, the more rapid elimination of toxic matters through the greater functional activity of the liver and the kidneys, and the intense phagocytosis favored by the development of the lymphoid structures. Among other things, it was found that the toxicity of the urine was normal or increased during the pyrexial period; that it was augmented with the setting in of defervescence, and for several days afterward; and that, after several days of apyrexia, the toxicity became normal, or even subnormal. A discussion on enteric fever in children was held at the meeting of the American Pediatric Society.⁹⁹ Northrup, of New York, maintained the extreme rarity of the disease in children under 2 years of age. He stated that not a case had been observed in twenty years at the New York Foundling Hospital. Suspected cases had, upon post-mortem examination, proved to be instances of something else. Many children less than a year old, reared in institutions, after death present pathologically the lesions of enteric fever,—swelling of Peyer's patches, sometimes with ulceration; swollen mesenteric glands; enlarged spleen. Bacteriologic examination, however, fails to disclose the presence of typhoid bacilli. Earle, of Chicago,⁹⁹ reported 20 cases of enteric fever in children (10 males and 10 females), occurring in a community in which enteric fever had previously been comparatively rare. There were no deaths. The children varied in age from 2 to 15 years. The duration of the disease averaged 26 days, varying from 17 to 45. There was slight diarrhoea in 10 cases, severe diarrhoea in 7, and constipation in 3. Vomiting was present in a small percentage of cases. Tympanites was present in a considerable number. In 1 case inflammation of the deep femoral vein occurred. In 1 case parotiditis was a complication. Epistaxis was present in 11 cases. Bronchitis attended almost all. In none did intesti-

nal hæmorrhage occur. Rose-spots were observed in every case but one that was seen late. The spleen was enlarged in 14 cases. Pain in the abdomen was almost universally present. Pain in the head was usually complained of by the older patients. Impairment of speech was common. In 1 case complete deafness persisted for two or three weeks. Otitis developed in 1 case. The severe cases presented nervous manifestations. In 2 cases convulsions occurred. Periostitis developed in 1 case. In 5 cases relapses occurred, lasting for from fifteen to twenty days. Christopher, of Chicago, ⁸⁹_{Nov. 11}, related that he had seen what seemed to be mild cases of enteric fever in infants, but, owing to the invariable recovery, the diagnosis could not be confirmed. The symptoms commonly observed were: flatulence, enlargement of the spleen, roseola, pulmonary phenomena, and a peculiarly-coated tongue.

Fuller, of London, ⁶_{Nov. 7, '91} has reported a case of enteric fever in an infant 9 months old. The child had been listless, and had refused food for ten days; diarrhœa had been present but for a day; the stools were thick and yellow. The skin was dry and hot; the temperature was 102° F. (38.89° C.). The tongue was dry and furred. The abdomen was tympanitic; deep pressure seemed to cause pain: No spots could be detected. Death took place on the third day after the child came under observation. The brain was found congested, with an excess of fluid in the ventricles. Heart, liver, kidneys, spleen, and stomach were normal. The small intestine was red in the neighborhood of Peyer's patches, which were inflamed and elevated above the level of the surrounding surface; some of the lower ones were commencing to break down. The mesenteric glands were enlarged and the solitary glands of the cæcum were abnormally prominent. Another child in the same family and a woman in the same house presented corresponding symptoms.

Ogle, of London, ⁵₁₈₉₂ has reported a fatal case of enteric fever in an infant 4½ months old. The child had been well until vaccinated, six days before death, when vomiting set in. On the day of death the child was fretful, and vomited several times. A stool passed was solid and lemon-colored. At the autopsy evidences of rickets were found. The vertex of the brain was ecchymosed, and the left lateral ventricle contained an excess of fluid. Peyer's patches were swollen and reticulated,

and many, especially in the lower part of the ileum, were converted into ragged ulcers. The mucous membrane of the colon was covered with minute, inflamed, solitary glands, which were ulcerated in the ascending portion. The mucous membrane of the stomach was healthy. The mesenteric glands were enlarged. The spleen was large and soft.

From a study of a collection of cases, Albouze²¹²_{Sept. 19} has arrived at the conclusion that, in the large majority of cases of enteric fever in children, the tendon reflexes are enfeebled during the acute stage of the disease and exaggerated during convalescence. This observation may afford prognostic indications. The phenomena are thought to be dependent upon organic or functional changes in the spinal cord. Watkins, of Hill City, Tenn.,¹⁹⁹_{Jan. 3} has reported a case of enteric fever in a patient over 60 years old.

Symptomatology.—Wendland, of Berlin,⁴¹_{Aug. 28} reports two cases of afebrile enteric fever in which the correctness of the diagnosis was verified by the findings of the post-mortem examination. The practical conclusion is that the absence of febrile movement in a case in which the other symptoms are sufficient to make a diagnosis does not suffice to exclude enteric fever. In regard to prognosis, it is evident that the elevation of temperature is not a true index of the severity of the case. In uncomplicated cases, a fatal result is not to be anticipated from pyrexia alone; so that antipyretics may ordinarily be dispensed with. Carrieu²⁰⁶_{Nov. 29, 49, 78},¹²⁶_{July 15} has observed that, in some cases of enteric fever, the pulse is remarkably slow in proportion to the elevation of temperature. The condition is to be distinguished from threatened collapse dependent upon cardiac failure. It is probably dependent upon a toxic influence acting upon the pneumogastric nerve, and is not associated with a myocarditis.

Finley²⁰²_{Aug} describes the case of an iron-roller, 21 years old, who was admitted to the Montreal General Hospital on the thirteenth day of an attack of enteric fever, presenting a copious eruption of rose-spots on the abdomen, chest, back, and buttocks; the spots were less abundant, but numerous upon the forehead, arms, and legs. Individual spots were found to persist for from three to five days, and a few fresh spots came out on areas of skin that had previously been clear. The disease pursued a mild course.

Diagnosis.—With a view of determining the diagnostic value of Ehrlich's urinary test (see the ANNUAL for 1890, vol i, H-37), Edwards, of Chicago, ⁹_{Apr.}, made a series of 600 urinalyses in a large number of medical and surgical cases. Of 130 cases of enteric fever, the reaction was absent in 2 undoubted cases. The intensity of the reaction bore no relation to the termination of the case. The length of time during which the reaction was present could not always be determined, but in 63 cases this averaged thirteen days. The reaction bore no relation to the temperature, though most intense at the fastigium. It did not always disappear when the morning temperature became normal. The pyrexia usually persisted longer than the reaction, but in 17 cases the reaction was obtained after the fever had disappeared. It was present in 6 of 19 cases of enteritis or febricula; in 3 of 5 cases of malarial fever; in 25 cases of various forms of tuberculosis (absent in 5); in cases of rheumatism, nephritis, diabetes, carcinoma, syphilis, cardiac lesions, pneumonia, plumbism, cerebral hæmorrhage, septicæmia, arthritis, neuritis, gastritis, purpura, abscess, meningitis, cirrhosis of the liver, cholangitis, intestinal obstruction, and intussusception. The following conclusions are arrived at:—

1. The reaction is independent of any single disease or any group of diseases.
2. It is frequently found in urine containing albumen, peptone, biliary substances, sugar, aromatics, and possibly leucomaines or ptomaines.
3. More constant results were not obtained with the absolute alcohol than without its use.
4. Ehrlich's reaction is not always present in enteric fever, even at the acme of the disease. It is, therefore, at best only presumptive, and not positive, evidence of enteric fever.
5. Together with more reliable signs and symptoms, as temperature, enlarged spleen, etc., it may contribute to a diagnosis of enteric fever; and conversely, when absent, in 98½ cases out of 100, the disease is other than enteric fever.
6. It is found in many other diseases, some of which, in certain clinical features, may simulate enteric fever,—*e.g.*, septicæmia, uræmia, tuberculosis in its varied aspects (intestinal, peritoneal, miliary, etc.), as well as enteritis, malaria, and pneumonia. In differential diagnosis, therefore, when other distinctive symptoms are lacking, the sulphanilic-acid test is untrustworthy. It fails when most keenly wanted, and may be absent in otherwise typical typhoid fever.
7. If much reliance is

placed on the test, a relapse of enteric fever may be confounded with complications. Among the complications and early sequelæ that yield the reaction are acute nephritis, lobar pneumonia, pulmonary tuberculosis, pleurisy, etc. 8. Inasmuch as it occurs typically in many diseases in which the causes and elaborated products differ, and as the various compounds with which diazobenzene-sulphonic acid unites are as yet unknown, the reaction cannot commend itself to the scientific chemist, however it may be regarded clinically.

Sottas, of Paris, ²¹_{Mar.} calls attention to the fact that, while acute pulmonary tuberculosis frequently simulates enteric fever, it is uncommon for the latter to simulate the former. He reports a case that presented considerable difficulty in diagnosis. Slight cough was present, with sanguinolent expectoration, impaired percussion resonance at the bases of the lungs, enfeebled breathing, friction sounds, and fine râles,—some moist, some dry. Slight epistaxis occurred; ill-defined rose-spots appeared; the bowels were constipated. Tubercle bacilli, however, could not be found in the sputum. Defervescence, too, took place at the usual time, and the pulmonary phenomena entirely cleared up.

Complications, Intercurrent Affections, Sequelæ.—Bouveret, of Lyons, ²¹¹_{June 1, 12} has reported four cases in which, in the periods of defervescence of enteric fever, a chill would suddenly manifest itself, followed by elevation of temperature and sweating. The paroxysm was repeated at uncertain and irregular intervals, once or oftener, the patients appearing to be well in the intermissions. The manifestation was found to be related to no complication or intercurrent or secondary affection, and malarial poisoning could be excluded. In explanation of the occurrence, the view is expressed that, under ordinary circumstances, the toxic matters generated in the course and as a part of the primary disease are slowly eliminated, and gradually find their way into the circulation; under other circumstances, that cannot be clearly defined, however, a large volume of these toxic matters is thrown into the blood at once, and the peculiar and unusual symptoms appear as a consequence. The condition is not a dangerous one, although at times an alarming one.

Fränkel, of Lyons, ²¹¹_{June 19} has reported a case of enteric fever in a recently-married woman of 19 years, who had shortly before

returned from Italy. Baths were advantageously employed in treatment. Intestinal hæmorrhage, however, took place. The primary attack was followed by a relapse. During the period of defervescence a chill suddenly occurred, followed by elevation of temperature and sweating. Spleen and liver were enlarged, and the latter was tender on pressure. The stools presented no abnormality, and the urine contained no albumen. A bed-sore had formed. No other complications could be detected. An examination of the blood was not made. The paroxysms were repeated for several days. The patient ultimately recovered. In seeking for an explanation of the periodic febrile exacerbations, it is admitted that these might have been due to malarial intoxication, but the view is expressed that it is more likely that at the time of the occurrence of the hæmorrhage a thrombus formed in one of the mesenteric vessels, in which suppuration subsequently took place, and secondarily to which miliary abscesses formed in the liver.

Rioblanco ²⁴⁸_{Nov., Dec., 71} has reviewed the nervous complications and sequelæ of enteric fever. These may appear at any period of the attack—with the invasion, at the height, in the decline, in convalescence, or subsequently. Thayer ⁷⁶⁴_{Jan., Feb.} has reported a case in which, during convalescence from a mild attack, symptoms of melancholia developed, with well-defined delusions. Donkin ⁶_{Apr. 23} relates the case of a woman, 30 years old, who had been nursing two cases of enteric fever in a house in which the drains were believed to be defective. One of these cases pursued a severe course, being attended with profuse, fetid diarrhœa and terminating fatally. Symptoms of enteric fever appeared in the nurse while yet on duty. In the course of the attack signs of diffuse bronchitis appeared. At the end of a month the attack was apparently at an end. The patient complained of headache. At about this time it became necessary to administer an enema for the relief of constipation. The patient was found with consciousness much impaired and an inability to articulate. The left eyelid drooped and the right arm and leg were paralyzed. The patient apparently heard and understood what was said to her. The tongue was protruded in the median line. Swallowing was difficult, and there was incontinence of urine. In the next few days the paralysis became complete, and there was considerable loss of sensibility in the affected extremities. The breathing was labored,

and fæcal incontinence was added. The temperature rose, fresh spots appeared, the bowels became loose, and vomiting set in. The symptoms continued for several days, and were followed by a fatal termination. At the post-mortem examination the left carotid artery was found occluded by a soft, dark clot, that extended to all of the principal branches, the middle cerebral artery being apparently the most affected, and the clot confined to the fissure of Sylvius. The area supplied by the middle cerebral artery was extremely disorganized, the softening involving especially the left corpus striatum, the island of Reil, the operculum, the anterior fourth of the upper internal temporo-sphenoidal convolution, the whole of the anterior cornu, and the wall of the lateral ventricle as far back as the front of the optic thalamus. The thalamus itself was softer than normal, principally in its outer part. At about the middle of the anterior edge of the lower lobe of the left lung was a faintly-yellow infarct about as large as a walnut. The corresponding pulmonary arteriole was occluded by a soft, dark clot. There were evidences of a general bronchitis. The pleura was smooth. The heart and peritoneum were normal. The mesenteric glands were large, soft, and blood-stained. The spleen was large and soft. Two large recent ulcers were found in the ileum; others were in process of cicatrization; some small, recent ulcers were found in the ascending colon. Newbolt, of Ellesmere Port, ⁶₁₈₇₇ has reported the case of a locomotive-fireman, 21 years old, in which, in the course of a relapse of enteric fever, loss of power appeared in the left arm and leg. Speech was interfered with, and the tongue, in being protruded, deviated to the right. The right eyelid drooped, and swallowing was difficult. Several hæmorrhages from the bowels took place, and the patient was threatened with collapse. For a time sensation was absent in the left upper and lower extremities. After a time the patient slowly improved, but perfect restoration of function failed to take place. The opinion is expressed that the condition was dependent upon the occlusion of one of the cerebral arteries by an embolus swept from the heart, or by the formation of a thrombus *in situ*.

Bury, of Manchester, ⁹⁰₁₈₈₈ has gathered from literature a number of cases of enteric fever, in which motor and sensory and symptoms suggestive of peripheral neuritis appeared during or subsequently to the pyrexial period, and reports two additional cases.

An analysis of the symptoms present shows that the paralysis is usually partial in extent and degree. In all probability the neuritis, of which the motor and sensory symptoms are manifestations, is the result of a toxic influence exerted by the poisons generated in the course of the disease with which they are associated. Potts, of Philadelphia, ¹¹²_{Sept.} has reported the case of a boy, 16 years old, who, during convalescence from an attack of enteric fever, followed by relapse, suffered with shooting pains in both legs, which were sensitive to touch, On attempting to walk, it was noticed that the feet dragged. There was complete loss of power in the anterior tibial and in the peroneal muscles of the left side; complete foot-drop, the toes of the foot being dragged; some weakness of the muscles on the right side; and slight tenderness or pressure over the anterior tibial nerve on the left side. Sensation was unimpaired. Electric examination disclosed the existence of the reaction of degeneration in the muscles supplied by the left anterior tibial nerve. On the right there were quantitative, but no qualitative, changes. By the employment of galvanism and the administration of strychnine, improvement slowly took place, until there remained only some difficulty in raising the left great toe.

Rosenberry, of Menominee, Mich., ²⁸³_{May} has reported two cases of what he believes to have been enteric fever, in which, during the period of convalescence, acute pain of sudden onset manifested itself in the præcordia, over a considerable area, as well as in the left shoulder and arm—symptoms which he considers as those of angina pectoris. It is suggested that the condition was dependent on changes in the heart-muscle induced in the course of the fever. Korczynski and Gluzinski, of Cracow, ⁷⁸³_{Nov. 2,} ⁸⁴⁴_{Apr. 22} have reported the occurrence of a greatly increased mortality in a number of cases of enteric fever that were placed in a ward which for many years had been occupied by surgical cases, but which, after thorough cleaning and painting, had remained unoccupied for three months. Of 9 cases, 4 died. In 1 case, diphtheria of the pharynx and phlegmonous inflammation of the larynx developed; in another, destructive ulceration of the epiglottis took place, with extensive inflammatory œdema of the subcutaneous tissues of the neck and of the submaxillary and parotid glands; in 3 cases, pyæmia with multiple abscesses appeared; in 3 cases in which recovery took place, suppurative inflammation of the middle ear occurred.

Neither in the pus found after death nor in that of the cases of otitis media were typhoid bacilli to be found; only the ordinary pyogenic cocci were present. Bacteriologic examination of the dust upon the walls and of the air of the ward in which the patients had been placed disclosed the presence of staphylococci and streptococci.

Hanquet⁴⁵⁴ has reported the case of a militiaman, who, in the fourth or fifth week of an attack of enteric fever, as convalescence was apparently about to set in, presented symptoms suggestive of the existence of acute septicæmia. First, the right lower extremity became œdematous, probably as a result of thrombosis of the femoral vein. Then a painful swelling appeared on the external aspect of the left thigh, in all probability as a result of a periostitis of the femur. At the same time a large abscess formed in the left axilla, which was incised and evacuated. Finally, a few days later, a painful swelling made its appearance at the upper portion of the right forearm, on its ulnar aspect. The greater part of the ulna became enlarged, the adjacent soft parts likewise participating in the swelling. Soon a sinus formed, giving vent to sanious pus. As, after a reasonable lapse of time, the condition displayed no tendency to heal, the parts were laid open and a sequestrum of bone was removed. It was not long thereafter that the patient was free of all complications. Clark, of Glasgow,⁶ observed the case of a laborer, 28 years old, in which the temperature began to be irregular on the twenty-sixth day of an attack of enteric fever, remaining, however, pyrexial. On the thirtieth day the right cheek presented slight bulging, and on the following day the right eye was completely closed, the upper and lower lids being greatly swollen. On the thirty-third day the left eye became involved, both lids swelling immensely. On the thirty-fifth day large non-glandular swellings formed at the angles of the lower jaw. By this time the outer half of the right upper eyelid had sloughed away, and there was considerable bogginess in the right temporal fossa over the ear. Collections of pus took place at the various places named and, although openings and counter-openings were promptly and freely made, portions of both upper eyelids sloughed; the patient gradually sank and died on the thirty-seventh day of the illness. It is thought that absorption of septic matter took place at the site of an unhealed ulcer in the bowel, as the result of which the pyæmic manifestations developed.

Valentini,⁶⁹ states that in a case of mild but well-defined enteric fever, on the day after the last elevation of temperature, a painful swelling was observed just below the right sterno-clavicular articulation. Fluctuation developed, and a week later an incision was made, evacuating 10 cubic centimetres ($2\frac{2}{3}$ fluidrachms) of thick, creamy pus. No micro-organisms could be found microscopically in the contents of the abscess, but upon cultivation in artificial media organisms corresponding with typhoid bacilli were found. It is inferred that the abscess was secondary to a perichondritis of the first rib caused by the bacilli of enteric fever. The hypothesis is expressed that, as the purulent complications of enteric fever appear only during convalescence, the bacilli have acquired the capability of inducing suppuration in the organism that has been rendered immune by the attack through which it has passed.

Girode,⁸⁰ has reported the case of a man, 29 years old, in which, at about the beginning of the third week of an attack of enteric fever, the right side of the scrotum became swollen. Examination showed the right epididymis to be enlarged. There was no urethritis. Five days later death took place from pulmonary complications. At the post-mortem examination, in addition to the intestinal ulceration, the tail of the epididymis was found to be enlarged, in conjunction with the existence of a small hydrocele. The epididymis contained numerous foci of pus in the intertubular connective tissue, while the arterioles were occluded by thrombi. In the pus and in sections, and upon culture in various media, the bacillus of Eberth was found. The opinion is expressed that the epididymis was infected by the bacilli finding their way, in the urine, from the kidney, by way of the seminal vesicles. The urine contained a considerable quantity of albumen, as if there might have been an infectious nephritis.

Fasching, of Gratz,⁸¹ reports the results of the examination of the pus obtained in three cases of post-typhoid suppuration. In the first case multiple abscesses formed a few days after defervescence had set in. The pus from one of the abscesses contained many cocci and a few bacilli. By culture, it was possible to isolate two bacilli, one of which corresponded in all particulars with the bacillus of enteric fever; the identity of the other was not determined. In the second case, during convalescence, foci of suppu-

ration appeared deep in the muscles and in the periosteum of the tibia. Two and a half years later, without trauma or other recognized cause, an abscess formed in a corresponding situation. In the third case abscesses formed in the tongue. In all of these cases only staphylococci pyogenes aurei were found. The typhoid bacilli presented certain deviations from the normal, which corresponded with the changes observed in control cultures likewise obtained from pus. Moreover, the cultures developed more slowly on gelatin, produced less acid, and grew more luxuriantly on potatoes.

Cushing, of Dublin, Va.,⁸¹ reported the case of a colored woman, 28 years old, who had nursed her husband in an attack of enteric fever, and subsequently herself presented the symptoms of the disease. In the second or third week the woman complained of pain in the left leg, which felt cold and clammy; the pulse was infrequent, the temperature subnormal. Arterial pulsation could be felt in the groin, but not below the level of the profunda. In spite of the employment of local and constitutional remedies, gangrene of the leg set in, a line of demarkation forming posteriorly, a little above the knee-joint, and anteriorly extending almost to the upper third of the thigh. Sloughing finally took place, and after six or eight weeks the woman died.

Rosin and Hirschel,^{89, 112} have reported a case of enteric fever in a man, in which, on the twentieth day after having taken to bed, the temperature having already reached normal, an area of infiltration about an inch in diameter was observed just below one knee. The temperature rose and the whole leg and ankle became oedematous. A deep incision into the tissues failed to disclose the presence of pus, but the knife passed through dense, indurated tissue. From the superficial muscular layer a quantity of dark-brown necrotic tissue escaped. The edges and base of the wound became infiltrated, but the wound slowly healed. Examination of the necrotic tissue, both microscopically and by culture methods, disclosed the presence of bacilli of enteric fever.

At a meeting of the Chicago Pathological Society, Schaefer,⁸¹ reported the case of a colored man, 39 years old, who presented symptoms of enteric fever: headache, epistaxis, pain in the right iliac fossa, gurgling, petechial spots, elevation of temperature, increased frequency of pulse. At the end of six or seven weeks

chills appeared, with tenderness over the liver. Abscess of the liver was diagnosticated and operation proposed, but the latter was rejected. Subsequently ascites developed, for the relief of which paracentesis was performed. Shortly afterward the abscess pointed, and about 1 gallon (4 litres) of pus was evacuated. A few days later the man died. At the post-mortem examination an abscess as large as two fists was found on the upper surface of the right lobe of the liver. The liver was adherent to the parietal peritoneum about three inches below the costal arch, the left lobe being pushed up under the diaphragm. In the discussion that followed the reading of the report the question of diagnosis was raised, and the possibility was suggested of the condition having been one of hepatic abscess from the outset. Bourdillon, of Marseilles,⁴⁶ Nov. 15, 91 has reported the case of a man, 32 years old, in which, at the period of decline of an attack of enteric fever of ordinary intensity, the symptoms of atrophic cirrhosis of the liver manifested themselves, with icterus and ascites. The patient had, during the previous two years, from time to time, presented symptoms of gastro-hepatic derangement, but not those of an organic affection of the liver. Bacteriologic examination of the blood, made a month after convalescence from the attack of enteric fever, disclosed the presence of streptococci. The question arises whether the interstitial inflammation of the liver was induced or aggravated by the attack of enteric fever, with its contingent intoxication, or resulted from the presence of the micro-organisms in the blood.

Favier²⁴³ May has reported a case of enteric fever, complicated by the occurrence of splenitis, advancing to suppuration, together with left-sided pleurisy, and terminating fatally; and a second case of enteric fever, complicated by perisplenitis and left-sided pleurisy, in which recovery took place. It is not quite clear at what period in the disease the complications arose, although it seems to have been late. In the first case the most prominent symptom was intense pain in the left hypochondrium, over the spleen; spontaneous, aggravated by pressure, by palpation, and by movement. The area of splenic percussion dullness was somewhat increased. The percussion resonance was slightly impaired at the base of the left lung, and pleural friction could be heard on auscultation. Local bleeding and the administration of sedatives were attended with no relief, but the application of a dozen leeches about the

anus was speedily followed by amelioration. The patient apparently began to improve, but a typhoid condition developed, and death took place. At the post-mortem examination the heart-muscle was found fatty, the lungs congested; there were evidences of a recent pleurisy at the base of the left lung; the small intestine presented numerous ulcerations; the mesenteric glands were enlarged; the spleen was enlarged, friable, and adherent to the diaphragm, and contained a superficial abscess as large as a small apple. The second case was also marked by intense pain in the left hypochondrium and by considerable enlargement of the spleen; it was further complicated by the occurrence of intestinal hæmorrhage; left-sided pleurisy, with effusion, developed. The symptoms gradually subsided, but recurred later in the course of the disease. Recovery finally ensued. Kraft⁸⁶⁵_{p.127}; ⁸⁶⁸_{Mar.19} has made a study of intestinal hæmorrhage in the course of enteric fever. He found the complication to occur in 4.24 per cent. of cases. Women seem rather more predisposed to its occurrence than men; 26.2 per cent. of the cases in which intestinal hæmorrhage takes place terminate fatally, males dying in larger proportion than females. The hæmorrhage is commonly repeated. Of forty-two cases hæmorrhage was repeated in twenty-nine. The quantity of blood lost varies from 150 cubic centimetres to 2 litres (5 ounces to 2 quarts), but the prognosis is not directly dependent upon the amount of blood lost. The complication usually occurs toward the end of the second or the beginning of the third week. Among the symptoms are bloody stools, anæmia, reduction of temperature, increased frequency of pulse, collapse, and sometimes delirium. The diagnosis is easy, the prognosis not unfavorable.

Kinkead, of Galway,¹⁶ reported the case of a woman, 52 years old, who came under observation on October 2, 1891, after having had diarrhœa for five weeks. The symptoms of enteric fever were well marked: rose-spots; tympanites; pain, tenderness, and gurgling in the right iliac fossa; elevation of temperature; pea-soup stools. The urine was scanty, of low specific gravity, and contained albumen. On October 8th pneumonia developed at the left base. On October 13th copious hæmorrhage from the bowels took place. On October 27th the pneumonia involved both bases. On November 8th a more profuse hæmorrhage than the first took place. On December 24th the stools began to be formed, and on the 30th

the temperature began to decline. Without obvious cause, the temperature again rose on January 16th, to decline once more on the 30th. The patient was dismissed from the hospital on February 9th. Subsequently, she presented transient elevations of temperature. On March 11th she had profuse bleeding from the throat, the blood apparently coming from a point behind and below the left tonsil. During the progress of the fever digestion and absorption were much enfeebled. If alcohol was withheld, the heart threatened to fail. Milk disagreeing, bread-jelly was given and relished, as well as digested. Quinine was well borne, but proved inert to reduce the temperature. Turpentine stupes relieved the abdominal distension. Ergot was principally used to check hæmorrhage. Almost continuous dry cupping was kept up over the lumbar and thoracic regions.

Elsner, of Syracuse,²⁰⁶⁵ describes the case of a man, 27 years old, who came under observation in the second week of an enteric fever, with characteristic symptoms and hypostatic congestion of the bases of the lungs. Diarrhœa was absent, and there was only the usual degree of tympanites. The treatment consisted essentially in restriction of the diet to liquids, the administration of intestinal antiseptics, and the avoidance of antipyretics. After the lapse of a week a decided change was suddenly observed to have taken place. The face became anxious; the eyes sunken. There was constant hiccough, with vomiting of a dark-green fluid. There was pain of moderate intensity in the upper portion of the hypogastrium, on the right side. The pulse was increased in frequency, while the temperature remained elevated. The abdominal tenderness became increased in intensity and extent, and soon dullness on percussion could be elicited in the right hypogastrium. For eight hours there was anuria, followed by scanty micturition. On the following day tumefaction could be detected in the region in which dullness had already been observed. Localized peritonitis over an ulcer of the bowel, with adhesion, was diagnosed. A day later the temperature had become subnormal and the extremities cold. The area of hepatic percussion dullness was not effaced. For the next few days there was little change in the condition of the patient, except an apparently slight improvement. He was then suddenly seized with five copious intestinal hæmorrhages, and soon died, almost exsanguinated. At the post-mortem

examination the intestines were found distended. There was no general peritonitis. At a few points spots of plastic exudate could be seen. There were, however, present the evidences of a recent and circumscribed plastic peritonitis in the right inguinal region. The source of the fatal hæmorrhage could not, however, be determined.

Lafleur²⁸²_{Oct. 21} has reported the case of an inebriate, 25 years old, who died on the fortieth day of an attack of enteric fever, and in which the occurrence of perforation was indicated by a decline of the temperature from 101° to 96° F. (38.3° to 35.5° C.). At the post-mortem examination general purulent peritonitis was found; a pinhole perforation was found at the base of an ulcer five or six inches above the ileo-cæcal valve. At a meeting of the Royal Academy of Medicine of Ireland, O'Carroll²_{Feb. 11} presented specimens from a case of enteric fever, in which perforation of the intestine occurred on the thirty-sixth day, the patient not dying until the fifty-ninth day. The intestines in the hypogastric and pelvic regions were matted together by peritonitis, and a perforation was found in the ileum, communicating with an abscess-cavity full of grumous pus. All of the intestinal ulcers, except that which was the seat of perforation, had healed. At a meeting of the Medico-Chirurgical Society of Montreal, Finley²⁸²_{July} exhibited a specimen of a typhoid ulcer, with a small, round, central perforation. A small quantity of fluid had been present in the peritoneal cavity, but there had been no general peritonitis. The spleen was remarkably small, weighing but 95 grammes (3 ounces). The attack had set in suddenly, and ran a mild course until the thirteenth day, when the patient was seized with sudden pain in the abdomen, the temperature falling to 95° F. (35° C.), the pulse becoming weak, and vomiting and abdominal distension making their appearance. The temperature, subsequently, never rose above normal. The patient survived the perforation for nearly four days.

Bayer¹⁸⁶_{July 12} has reported the case of a colleague, who presented himself on account of aphonia and dysphagia, examination disclosing the existence of acute laryngo-pharyngitis. The symptoms subsided upon the institution of appropriate treatment, but after the lapse of a few days the man was seized with a severe chill, followed by decided elevation of temperature. He complained considerably of sore throat and discomfort in the naso-pharynx. On ex-

amination, a number of small, superficial ulcers were now found on the soft palate, on the pillars of the fauces, and in the pharynx. A day later rose-spots made their appearance. In particles of tissue removed from the borders of the ulcerated areas the bacillus of enteric fever was found. The catarrhal condition of the pharynx extended to the Eustachian tubes, deafness resulting. The ulceration in the pharynx disappeared toward the end of the third week, but the temperature failed to decline, while intestinal hæmorrhage occurred and pneumonia developed, to which the patient finally succumbed. Bayer calls attention to the fact that the respiratory complications of enteric fever generally appear toward the end of the first week as rhinitis, with injection of the mucous membrane of the pharynx and larynx, and the accumulation of viscid, sanguinolent mucus in the naso-pharynx; catarrh of the Eustachian tube and middle ear, giving rise to deafness. Sometimes intense angina is observed. Superficial ulceration of the palate, pharynx, and uvula may occur, which, although of itself not grave, is unfavorable as regards prognosis; it assumes diagnostic significance by reason of the presence of the bacillus of enteric fever.

Rénon ¹⁰⁰_{Aug. 3} reports two cases of enteric fever in which membrane formed upon the tissues in and about the pharynx. The one case occurred in a man 23 years old, the pharyngeal manifestations appearing toward the close of the attack; by direct examination and by culture the presence of streptococci in the membrane was demonstrated. Later, a thrombus formed in the left internal saphenous vein. The patient recovered. In the second case—a man, 29 years old—the pharyngeal complication appeared early; in the membrane staphylococci pyogenes albi were found. Later in the attack an abscess formed at the lower epiphysis of the right tibia, at the site of an old fracture, in the pus from which staphylococci were also found. In both instances the specific bacillus of enteric fever was looked for, but was not found. This patient also recovered. Both patients were treated by means of cold baths. Gerlóczy, of Budapest, ⁹⁹_{Apr. 14} has reported the case of a girl, 14 years old, who was seized with a chill, followed by fever, malaise, pain in swallowing and vomiting; the bowels were constipated. The tongue was heavily coated and tremulous on protrusion. The mucous membrane of the pharynx was livid and infiltrated; the tonsils and uvula were red and enlarged. The sub-

maxillary glands were slightly enlarged. Diffuse bronchitis existed. The spleen was somewhat enlarged. Respiration and pulse were accelerated. The urine contained a small quantity of albumen. The case was treated as one of diphtheria. Some ten days after the beginning of the illness several rose-spots were found on the abdomen and the spleen had increased in size. A day later membrane appeared in the throat. The two diseases steadily pursued their course. Dyspnoea became more and more marked; swallowing became impossible; pulmonary oedema set in, and the patient succumbed. At the post-mortem examination, in addition to the existence of membranous pharyngitis, laryngitis, and bronchitis, swelling and infiltration of the follicles of the ileum and of the mesenteric glands, enlargement of the spleen and parenchymatous degeneration of the liver and heart were found. A case of enteric fever is reported from the service of Tooth,⁶ at the Metropolitan Hospital, London, occurring in a boy 5 years old, in the course of which dullness on percussion developed at the base of the right lung, with large and small dry and moist râles. On about the eighteenth day of the illness laryngeal cough, with stridor and aphonia, appeared. The symptoms became more aggravated, cyanosis and recession of the chest-walls on inspiration supervening, but no membrane was to be detected in the pharynx. Finally, tracheotomy became necessary, but the relief afforded was only transient. The cervical glands became enlarged; evidences of the presence of membrane in the trachea appeared, and the patient succumbed to collapse on the twenty-fourth day. At the post-mortem examination the larynx and trachea were found lined with diphtheritic membrane. The right lung was completely consolidated with old broncho-pneumonia; the left lung was collapsed and somewhat congested. In the cæcum, close to the ileo-cæcal valve, was a congested Peyer's patch, slightly ulcerated at one point. Several similarly congested, but not ulcerated, Peyer's patches were found in the ileum. The mesenteric glands were enlarged, particularly those in relation with the cæcum. The spleen was enlarged to twice its natural size.

Robinson, of New York,⁵⁰ calls attention to the aural complications of enteric fever. Early in the attack, buzzing, whistling, ringing, and humming may be present. As a rule, these sensations soon diminish or disappear; occasionally, they become more intense

and of pathologic significance. With them may be associated pain in the ears. Notable pain is almost invariably indicative of acute local inflammation, either of the external auditory canal or, more probably, of the middle ear. At times impacted cerumen is the sole apparent cause of distress, and upon its removal the unpleasant symptoms subside. On other occasions the tympanic membrane is acutely inflamed. By judicious treatment this condition may be made to disappear in the course of a few days, without suppuration or perforation. Occasionally, perforation of the tympanic membrane will occur without the previous manifestation of pain. While aural pain and inflammation and perforation may occur early in the course of an attack of enteric fever, these complications are more common in the second and third weeks. Some degree of deafness is usual in enteric fever; one or both ears may be affected. The condition may be due to the extension of a catarrhal process from the pharynx to the middle ear by way of the Eustachian tubes; to the blunted sense perceptions incident to the poison of the disease; to periostitis of the middle ear, or to labyrinthine otitis. Otorrhœa in the course of enteric fever is more common in children than in adults, and is a frequent antecedent condition in connection with the cerebral complications occasionally encountered. Suppuration of the internal ear may be followed by meningitis. Caries of the petrous portion of the temporal bone is an occasional cause of purulent meningitis. Cerebral abscess is also a not infrequent sequel. Sinus thrombosis, suppuration of the mastoid cells, erysipelas, and general pyæmia are among the late and disastrous complications that may be encountered in connection with caries of the petrous portion of the temporal bone. Cases are on record in which acute suppuration of the middle ear has been attended with septic meningitis and death, and no involvement of the temporal bone has been found. In some cases the cerebral complications may arise through the medium of the general circulation. Independently of these complicating conditions, the middle ear may undergo suppuration during convalescence from enteric fever, and hearing be lost in consequence.

Eisendradth, of Chicago,⁹ has reported four cases of enteric fever in which facial erysipelas occurred as an intercurrent affection, all terminating fatally. The first case was in a man 26 years old, and was characterized by nervous symptoms and

asthenia. Erysipelas developed in about the third week. Death took place a few days later. Only the usual lesions were found at the post-mortem examination. The second case occurred three days after the first, in a male 28 years old, the patients occupying beds in the same ward, though some thirty feet apart. The first case was isolated, but both were attended by the same physician. In the second case albumen and tube-casts appeared in the urine, intestinal hæmorrhage occurred, and a round-worm was vomited. Erysipelas developed on the twenty-seventh day of the illness. Death took place eleven days later. The third and fourth cases occurred five months after the first and second; the patients occupied beds in different wards, but were under the care of the same physician. In the third case the patient was a woman 27 years old. Erysipelas appeared on the twenty-first day of the illness, and death took place three days later. The fourth case was separated from the preceding by an interval of eight days. The patient was a male 38 years old. Erysipelas appeared upon what was estimated to be the twenty-second day of the illness, and death took place thirty-six hours later. In the first, second, and fourth cases, it is thought that an abrasion of the nose, as a result of picking, provided the channel of infection.

Donald⁶ has reported two cases of enteric fever in sisters, 4 and 8 years old, respectively, situated amid unfavorable hygienic conditions, one child having been taken ill a day or two after the other. The symptoms were much alike in the two cases, nervous manifestations predominating. Toward the close of the second week a typhoid condition developed, and a few days later a hard swelling appeared in the right cheek of the younger child, which gradually increased in size and became tense and glazed externally. Ulceration took place internally, but the child became comatose and died before perforation had taken place externally. Induration of the right cheek appeared in the elder child two days later than in the younger, and pursued a similar course to a fatal termination.

Littlejohn² has reported two fatal cases of noma following enteric fever, in children being treated in the same ward, at the same time, and attended by the same nurse. In one case both cheeks were involved; in the other, in addition to the involvement of one cheek, the skin below the right trochanter became gangrenous before death.

Gerlóczy, of Budapest, ⁶⁹_{Apr. 14} has recorded the case of a girl, 9 years old, who for three days complained of intense headache. Then a chill occurred and fever set in. In the course of a few days the malaise became so marked that the child was compelled to take to bed. During this time the bowels moved loosely three or four times a day. The pupils were large and reacted sluggishly. Restlessness was a marked feature. The abdomen was slightly tumid. The pulse was exceedingly rapid. The temperature was now 36.5° C. (97.7° F.). The urine was passed involuntarily. The patient was delirious, and cried constantly and most vociferously. There was marked hyperæsthesia. The case was treated as one of meningitis. Most of the time the temperature remained below the normal; occasionally it rose slightly above. The cerebral symptoms gradually subsided. Hitherto it had been impossible to make a physical examination. It was now found that the spleen was enlarged. The bowels had been loose throughout. Three weeks after the onset of the symptoms rose-spots were detected upon the abdomen. At the same time four small abscesses were found upon the scalp. Although the child continued to improve, other furuncles appeared upon the face and abdomen and in the gluteal regions. Later still, a fine, measy eruption appeared upon the chest, abdomen, and back, along the spinal column, on the arms, and on the extensor surfaces of the legs. The eruption disappeared in the course of a few days, fine desquamation following. In spite of the many complications, convalescence ultimately set in, and the patient eventually made a satisfactory recovery.

At a meeting of the Glasgow Pathological and Clinical Society, Mackintosh ²¹⁸_{July} presented a man, 19 years old, who had had an enteric fever six years previously, being confined to bed for twelve weeks. In the tenth week of the illness his feet began to swell. Six weeks later he was attacked with scarlatina. The legs remained swollen. Shortly afterward the subcutaneous veins of the trunk and extremities were noticed to be prominent. The swelling of the legs gradually disappeared, but the condition of the veins persisted. The veins more especially involved were the internal mammary, superficial epigastric, external pudic, internal saphenous, and superficial circumflex on both sides, through which a collateral venous circulation was carried on. The inference is

that a thrombus formed at the junction of the iliac veins and the inferior vena cava, became organized, and thus constituted a permanent obstruction to the venous blood-current from the lower extremities.

Reynolds, of Wolverhampton, ² reported the case of a boy, 14 years old, in which, on the sixteenth day of apparent convalescence from an attack of enteric fever, the temperature again rose and the diarrhœa returned with its previous severity. This attack pursued a shorter course than the primary attack, but a few days after its subsidence symptoms again appeared. A week later a large round-worm, ten or eleven inches long, was passed by the bowel. Recovery was thereafter uninterrupted. The primary attack is believed to have been one of enteric fever. It is a question whether the second was a relapse or was dependent upon the presence of the intestinal parasite. Moore, of Dublin, ¹⁶ treated a man who had a typical attack of enteric fever at the age of 15 years, lasting twenty-three days, characterized by constipation and unattended with complications. At the age of 29 years he had a second attack, lasting twenty-four days. After a subfebrile period of a week convalescence apparently set in. Eleven or twelve days later, however, acute febrile symptoms again appeared, and the patient passed through a well-defined relapse, which lasted twenty-two days, permanent recovery ultimately taking place. Jos. Leidy, Jr., of Philadelphia, ⁴⁵¹ has reported the case of a man who had had an attack of enteric fever in his sixteenth year and a second attack some six months later. A third attack occurred at the age of 34, and this in turn was followed by four relapses, in the third of which intestinal hæmorrhage occurred. Ultimate recovery ensued.

Diet.—Beatty, of Dublin, ¹⁶ has made a contribution to the subject of the dietetic management of cases of enteric fever. He agrees that milk is the best and safest food; given diluted with carbonated water, lime-water, or simple water, it agrees well with most patients. If diarrhœa exist, the milk is best boiled. Sometimes it becomes necessary to peptonize it. If milk is vomited or curds are passed by the bowel, whey may advantageously be substituted; at the same time beef-tea with the grounds, or beef-juice, should be given. Farinaceous foods and eggs are objected to. From 2 to 3 pints (1 to 1½ litres) of liquid nourishment in the twenty-four hours are considered sufficient for an adult. In case of

diarrhœa, an excess of liquid food is to be avoided. Constipation is not to be permitted to continue for more than two days, unless there have been preceding intestinal hæmorrhage. Hæmorrhage is to be guarded against, tympanites kept under control, and sleeplessness and delirium prevented by restriction of the diet. A favorable influence is also exercised upon the temperature by care in diet. Unlimited indulgence in simple drinks is not sanctioned. Water should be given in moderate quantities, or pieces of ice and a little lemonade may be allowed. Tea, morning and evening, is also grateful and safe. With the setting in of convalescence the consistence of the food is to be gradually increased. For a few days it is safer to increase the quantity of food than to make any change in its character. First, the milk may be thickened with corn-flour or arrow-root; then, after a few days, a lightly-boiled egg and a few plain biscuits may be given; then bread; then fish; and so on. A rise of temperature would indicate that the food was being increased too rapidly or injudiciously.

Püritz ⁸⁵⁰ ²⁸ gives the results of comparative observations made in a number of cases of enteric fever, some of which were kept upon the usual restricted diet, while others were placed upon a generous diet, given in small quantities at short intervals. It was found that in both groups of cases the patients steadily lost weight throughout the whole febrile period, until the occurrence of defervescence. In the patients who were well fed, however, the daily losses were less, while the amount of nitrogenous assimilation was greater than in the others. In the well-fed patients the daily losses of nitrogen (by the urine) was, on an average, 25 per cent. less than in the underfed patients. The generous feeding appeared to exert a beneficial influence upon the course and symptoms of the disease.

Treatment.—A good summary of the current treatment of enteric fever is given in an editorial. ⁹ _{Sept. 10} The first place is given to the method of cold bathing of Brand, systematically carried out. The employment of antipyretic drugs, and especially those of the coal-tar series, is unqualifiedly condemned. In cases in which the full cold bath is contra-indicated, or for any other reason cannot be employed, frequent cold sponging, ice-rubbing, the cold wet-pack, cold spraying; the binding of cold cloths upon the wrists; the application of ice-bags to the head, chest, and abdomen; enemata

of ice-water, and various other methods of utilizing cold may be employed as more or less efficient substitutes. These cannot, however, fully replace the bath. Under such circumstances, an attempt should be made to secure intestinal antisepsis by the judicious use of drugs, such as calomel, beta-naphthol, naphthalin, salol, creasote, guaiacol benzoate, guaiacol salicylate, bismuth salicylate, zinc sulpho-carbolate, and the like. When the indications for turpentine (dry, glazed, or brown tongue, with tympanites) are present, it or terpin hydrate may be used. Strychnine is sometimes useful, especially toward the close of the third week, when the heart is becoming enfeebled. Alcohol also finds a place at about this time. Water must be given freely to drink throughout.

Barr, of Liverpool,²⁰⁷² has reported the treatment of fifty-five successive cases of enteric fever, with one death. Twenty-five patients were treated by continuous immersion in water. For this purpose a tank—6 feet long, nearly 3 feet wide, and 16 inches deep, lined with lead, and having a capacity of 70 gallons—was employed. The patient, wrapped in a blanket, rests upon bed-ticking, the head, of course, not being immersed. Special provision is made for carrying off the dejections and for renewing the water, as well as changing its temperature, as circumstances require. A thermometer is constantly kept in the tank. As long as the temperature of the patient is over 100° F. (37.77° C.) that of the tank need not be higher than 93° F. (33.88° C.); but, as the body-temperature approaches the normal, so should the tank-temperature. Eleven cases received some special form of treatment, such as the wet-pack, etc. Twenty-two received symptomatic treatment. If retching and vomiting were present, and the patient came under observation early, an emetic was administered, preferably 2 or 3 tumblerfuls of hot water. Treatment was usually begun with a good calomel purge, about 2 grains (0.13 gramme) being given. If the attack were attended with constipation, calomel was also given throughout the disease, in doses of $\frac{1}{2}$ -grain (0.032 gramme), repeated according to indications. In cases of protracted constipation, in which intestinal ulceration is feared, an ice-bag, cold compresses to the abdomen, immersion in the tank, intestinal antiseptics with small doses of calomel, or turpentine either by the mouth or by enema, are indicated. The routine administration of intestinal antiseptics is strongly advocated. Salol

is preferred. Ten grains (0.65 gramme) may be given to an adult every four hours; if there be much diarrhoea, 10 grains of bismuth salicylate may be added to each dose; if the bowels are confined, $\frac{1}{2}$ grain (0.0054 gramme) of calomel may be given with each dose.

Wilkins²⁸²_{Jan.}⁹_{May 22} expresses himself heartily in favor of cold baths. Juhel-Rénoy⁸_{June 22} has reported the results of a collective investigation as to the mortality from enteric fever in the hands of those who employed divers modes of treatment. Of 60 physicians of whom he made inquiry, 40 replied. Of these 40, 14 expressed themselves as opposed to systematic bathing; 12 were strong advocates of the method, employing it in all cases, grave or mild; 8 were advocates of the method, but with certain restrictions; the remaining 4, while in favor of the method, had little opportunity for its application. Those of the first group had together treated 175 cases of enteric fever, with 25 deaths—14.2 per cent.; those of the second had treated 39 cases, with 1 death—2.56 per cent.; those of the third had treated 554 cases, with 54 deaths—9.74 per cent.; those of the fourth had treated 492 cases, with 40 deaths—8.13 per cent. For comparative purposes, the number of cases treated in the second group is too small to be of any value.

Rabinovitch¹_{Mar. 10} makes a strong plea for cold baths. She reports a case of enteric fever in a young girl, where acetanilid was employed to reduce the temperature; the case terminated fatally. Nine other cases, 3 of which were complicated with pneumonia and 1 with pleurisy with effusion, were treated by means of cold water, and all recovered. Ellett, of Philadelphia,⁹_{Dec. 12, '91} treated 39 cases by cold water applied externally, most commonly in the form of the bath, with 2 deaths. The Brand method was not accurately followed. O'Reilly⁷⁶⁰_{Sept. 24} reports that 34 cases were treated at St. Mary's Hospital, of Saginaw, Mich., during the year 1892. For the first nine months the treatment consisted in cold sponging and the administration of salol; 4 deaths occurred. In the last three months the administration of salol was continued, but cold baths were substituted for the sponging. More cases were treated during the last three months of the year than during the first nine months, but there were no deaths in the second period. Gogrewe, of Greifswald,⁶⁰_{Feb. 4} has reported 63 cases of enteric fever, with but 2

deaths. In treatment the greatest stress was laid upon change of posture and the employment of the graduated bath, the temperature of the water being reduced from 26° to 21° C. (78.8° to 69.8° F.). Other agents were used as indicated. Special care was taken to avoid constipation, for which salicyl-borated enemata were employed. Careful attention was also paid to the disinfection of the dejecta and of the linen of the patients.

Schmid, of Luzerne,²¹⁴_{Opel.} has reported a series of 30 cases of enteric fever, 10 of which were so mild as to require no systematic treatment, and the remaining 20 of which were treated with thallin. Of the latter, 15 were in males and 5 in females. The patients varied in age from 16 to 45 years. The diagnosis was unequivocal in all of these cases. The diet consisted principally of milk, together with a little meat-broth, egg, and alcohol; the last in quantity in accordance with intensity of the attack and the individuality of the patient. In most cases an initial dose of calomel was given. In many cases the administration of thallin was begun on the day of admission to hospital; in other cases on from the second to the fifth day, partly because the diagnosis was not positive and partly to determine the type of temperature. It was found most convenient to give the drug in a 1-per-cent. or 2-per-cent. solution. During the day, from 6 A.M. to 9 P.M., it was administered every hour; during the night, in some cases every three hours, in other cases every two hours. At first, from 0.08 to 0.15 gramme ($1\frac{1}{4}$ to $2\frac{3}{8}$ grains) of thallin was given. The temperature was taken each time before the medicine was given. The dose was gradually increased, until it proved sufficient to keep the temperature at the normal level, or a little lower. If the temperature became lower, the remedy was temporarily withheld. The smallest maximum dose was 0.12 gramme ($1\frac{1}{8}$ grains); the largest, 0.4 gramme (6 grains). The largest amounts given in 24 hours were 7.54, 7.6, and 7.88 grammes (116, 117, and 162 grains), respectively; the largest total amounts given were 137.31 grammes ($4\frac{3}{8}$ ounces) in 23 days, and 177.99 grammes ($5\frac{1}{4}$ ounces) in 27 days, respectively. The shortest periods for which the drug was used were 5 and 7 days, respectively; the longest, 18, 21, 23, and 29, respectively. Of the 20 cases treated with thallin, 2 died: one from perforation; the other, a right hemiplegic, in an attack of dyspnoea, of which he had previously had repeated

attacks. The most conspicuous effect of the medication was observed on the course of the temperature. In most cases this could be kept practically at the normal level. The belief is expressed that the result is dependent upon an antifebrile action. No evil effects upon the heart were observed; collapse did not appear, and the frequency of the pulse was in harmony with the febrile condition. No unpleasant symptoms referable to the kidneys were observed. The remedy was almost universally well borne. In no case did it appear to occasion diarrhoea. In almost all the cases sweating (with the decline) and chilliness (with the ascent of the temperature) constituted unpleasant features. As a rule, the sensorium became clear and the general condition remained good. Five relapses occurred. There were no complications, except that of perforation in one of the fatal cases.

Musser, of Philadelphia,²⁰⁷³ calls attention to the danger of administering antipyretics under certain conditions in the course of enteric fever: in the early or middle period of the disease in cases in which patients are brought from a distance; in certain cases in which the patients manifest an idiosyncrasy to antipyretics; in the later stages; and in cases in which, although the morbid process has come to an end, the temperature continues high or actually rises. Lewers²⁶⁷_{Oct., vi} found that, in 19 cases in which no antipyretic drug was given, the average residence in the hospital was $57\frac{1}{2}$ days, while in 15 cases in which such drugs were employed the average was 73.6 days. In the first group of cases there were 2 relapses; in the second, 9; 2 cases relapsing twice.

Eliot, of New Haven,¹_{Aug. 6} designates as specific the treatment of enteric fever by means of carbolic acid and tincture of iodine in conjunction with calomel. He directs that the patient take 10 grains (0.65 gramme) of calomel on alternate days until four doses have been taken. Of a mixture containing 1 drachm (3.89 grammes) of carbolic acid and sufficient tincture of iodine to make 4 drachms (15 grammes), 4 drops are given in a wineglassful of cold water every four hours. Proportionately smaller doses are given to children. To attain success, the treatment must be instituted early and continued late. If the bowels are not moved within twelve hours after the ingestion of a 10-grain (0.65 gramme) dose of calomel, it is recommended that 1-drachm (3.89 grammes) doses of magnesium sulphate be given every four hours until a movement occurs.

Should symptoms of mercurialism appear, a mouth-wash of potassium chlorate, 1 drachm to 4 ounces (3.89 to 120 grammes) of water, should be employed. Based upon personal experience, Stinson, of Montague, Texas,⁹ recommends the following combination:—

R Quininæ sulphatis,
Potassii chloratis, ℥ss gr. x (0.65 gramme).
Acidi carbonici puri, ℥x (0.65 gramme).

M. fiat capsulæ no. x.

Sig.: One every four hours, with two, three, or four drops of oil of turpentine.

If the fever is active, tincture of veratrum viride is given, in doses of one, two, or three drops.

Pearson, of Stockenstrom, Cape Colony,⁶ employed, with most gratifying results, a solution of chlorinated soda in the treatment of a large number of cases of enteric fever. The solution is prepared by dissolving 1½ pounds (745 grammes) of sodium carbonate in 24 ounces (720 grammes) of water; triturating well a pound (497 grammes) of calcium chloride in 120 ounces (3600 grammes) of water, filtering; then mixing the two solutions, and again filtering. The solution should be perfectly clear and free from any trace of lime. It should be kept in a cool and dark place. Of this solution, 15 minims (0.97 gramme) are given to an adult every three hours. The bowels are not interfered with unless there be constipation for forty-eight hours, when a mild dose of castor-oil is given. The treatment is continued until the temperature has been normal for two successive evenings. Anderson, of Barrow-in-Furness,² successfully employed a solution of ferric chloride in a large number of cases of enteric fever, without a death when the treatment was instituted before unavoidably fatal conditions had arisen. To an adult he administers 5 drops of the liquor ferri perchloridi fortior, B. P., every hour of the day or night until a week after the complete subsidence of the fever. The dose can be agreeably given in ½ drachm (2 grammes) of glycerin or 1 drachm (4 grammes) of simple syrup and a few drops of tincture of strong ginger, diluted with ½ tumblerful of water. If nausea is produced, 5 grains (0.32 gramme) of bismuth subnitrate are given ten minutes before each dose. Werner,²¹ reported the employment of chloroform in one hundred and twenty-six cases of enteric fever, with but four deaths. The drug was used in a 1-per-

cent. solution, of which 1 or 2 tablespoonfuls were administered every hour or two, by night as well as by day, at the height of the attack; in the decline of the attack a tablespoonful was given every two or three hours. In general the symptoms were favorably influenced and complications and sequelæ were uncommon.

Klietsch, of Wörth-am-Main,⁹⁴ has reported an epidemic of enteric fever engendered by the contamination of the water-supply by an old and unused privy-well, 121 persons—53 males and 68 females—being affected. A large variety of therapeutic measures were employed, including cold baths, cold applications, acetanilid, antifebrin, quinine, thallin, phenacetin, resorcin, salicin, potassium chlorate, creasote, calomel, and iodine. The last was employed in the form of potassium iodide, iodoform, and the pure metal, and appeared to act as a specific. Eighty-one cases were thus treated, with but two deaths: one from perforation after an error in diet during convalescence, the other from meningitis. The following formula was largely employed:—

R Iodí, gr. viiiss-xiiss (0.5 - 0.8 gramme).
 Potassii iodidi, ℥iiss-ij (6.0 - 8.0 grammes).
 Aq. menth. pip.,
 Aq. destil., āā ℥iiss (10.0 grammes).
 M. Sig. : From 8 to 10 drops every two hours.

Fussell, of Philadelphia,¹¹² lauds the utility of salol in the treatment of enteric fever. He admits that it is not a specific, but thinks that it materially shortens the course of the disease, controls the diarrhœa, changes the character and overcomes the fœtor of the stools, and relieves the dryness of the mucous membranes. The drug was given in 5-grain (0.32 gramme) doses every three hours. Of thirty-eight cases thus treated, four terminated fatally, one, however, as a result of neglected intestinal hæmorrhage. No unpleasant effects could be observed. Farrar, of Camden, N. J.,⁹ commends the employment of bismuth subiodide and salol. This therapeusis has seemed to him to diminish tympanites, control diarrhœa, and prevent hæmorrhage. The two drugs were administered alternately. Twenty-six cases were thus successfully treated.

Hervouët¹²⁷ reported the conjoined employment of laxatives and intestinal antiseptics in the treatment of sixty-three cases of enteric fever, with but two deaths. A vigorous purgative was

given at the outset. Thereafter, until the termination, from 2 to 4 drachms (8 to 15 grammes) of magnesium sulphate were given daily, together with from 30 to 45 grains (2 to 3 grammes) of naphthol. Bouillon, milk, and water were permitted in abundance.

Nealey, of Bangor, Me.,¹¹² from his own experience, recommends, for the relief of the tympanites that sometimes appears in the course of enteric fever, and occasionally contributes to a fatal termination, the employment of an enema containing 1 ounce (30 grammes) of salts, 2 ounces (60 grammes) of glycerin, 3 ounces (90 grammes) of warm water, and 30 drops of turpentine. Langdon, of Cincinnati,⁶¹ used mercuric chloride, in doses of from $\frac{1}{4}$ to $\frac{1}{2}$ grain (0.0025 to 0.005 gramme), administered three or four times a day, in tablet or in glycerin and water, in fifty cases, without a death. As a matter of course, the usual restrictions in diet were observed.

Simone⁵⁴⁹ expresses the opinion that the elevation of temperature that occurs during the first ten days of enteric fever is dependent upon the infection of the bacillus of the disease, while the subsequent fever is mainly due to the presence of other bacteria in the alimentary canal. In conformity with this view, he administers $\frac{1}{4}$ grain (0.05 gramme) of calomel and $\frac{1}{8}$ grain (0.01 gramme) of opium every two to four hours. The good effects of the medication are seen especially after the first ten days of the disease.

Stewart, of Philadelphia,⁹ points out that the inutility of ergot in the intestinal hæmorrhage occurring during the course of enteric fever is dependent upon the fact that the bleeding takes place from an eroded artery, and that, by causing constriction of the arterioles, ergot only tends to increase the loss of blood by increasing the resistance *à fronte*. Another objection to the employment of ergot under these circumstances is, that by exciting peristalsis it is likely to favor the detachment of sloughs, with consecutive hæmorrhage.

TYPHUS FEVER.

Brannan and Cheesman,⁵⁹ record some observations made in connection with the epidemic of typhus fever that prevailed early in the year in the city of New York. Of 185 cases treated at the

Riverside Hospital, on North Brother Island, 28 died,—a mortality of 15 per cent. Some of the deaths were due to complications, but the majority were due to the fever itself. Post-mortem examinations were made in 4 of the fatal cases, all of the organs except the brain and spinal cord being studied. The pathological appearances were pretty much the same in all of the cases, varying only in degree. There was acute degeneration of the liver and kidneys, with swelling and hyperplasia of the spleen. In 1 case an unusual accumulation of large, irregular, moderately granular cells, either free in the capillaries of the liver or clinging to their walls, was observed. Morphologic and biologic examination of the blood and viscera from 3 of the fatal cases failed to disclose the presence of micro-organisms. Morphologic and biologic examination of the blood obtained, with appropriate precautions, from the finger-tips of 6 living patients, disclosed the presence of a bacillus that proved pathogenic for rabbits, guinea-pigs, and white mice. The organism varied from 0.5 to 0.8 μ in diameter, and from 1.0 to 2.5 μ in length. It occurred singly and in pairs, and infrequently in chains of six or eight. It often appeared club-shaped, and in young cultures was ovoid. It stained readily with the ordinary aniline colors, and retained the stain of Gram's method. After several days' growth, some of the bacilli stained irregularly, presenting a mottled appearance. The organisms were immobile; spores were not found, although some of the club-shaped bacilli showed circular, unstained spots that did not color when the methods for staining spores were employed. The organism grew most abundantly upon beef blood-serum at a temperature of 37.5° C. (99.5° F.). No growth was obtained on gelatin or upon any medium at a temperature below 27° C. (80.6° F.). Development took place beneath a mica plate and in an atmosphere of hydrogen, but the growth was not so abundant as in aërobic cultures.

Lewaschew ⁶⁹_{Nov. 13, 94} detected in the blood of a considerable number of persons suffering with typhus fever, and cultivated from blood removed from the spleen and from the finger, a distinctive micro-organism. Cultivations upon the usual media proved



BACILLI FROM CULTURE IN TYPHUS FEVER, SHOWING IRREGULARITIES OF FORM AND STAINING.

(Medical Record.)

unsuccessful. By the employment of a 1-per-cent. or a 1½-per-cent. serum-agar, made with ascites fluid, it was possible to reproduce the organism. At temperatures of from 96.8° to 98.6° F. (36° to 37° C.), a characteristic growth developed in from twenty-four to forty-eight hours. No growth took place, however, at ordinary room-temperature, although the capability of subsequent development under proper conditions was preserved even after the lapse of a considerable time. A small quantity of such a culture, viewed in a drop of bouillon or of physiological salt solution, was seen to contain myriads of cocci, of from 0.2 to 0.5 μ in diameter. The organisms usually appeared singly, seldom in pairs, and rarely in small chains. Some were not in motion, while others were in active movement. In harmony with this observation, it was possible to detect a long, tenuous process in connection with many of the cocci, even without special preparation, but more distinctly after staining by the method of Loeffler. Under high powers of the microscope, corresponding organisms were found in blood obtained from the spleen and from the tip of the finger. The cilia could not be brought out by staining with the ordinary aniline colors, but they became apparent after treatment with a 2-per-cent. or a 3-per-cent. solution of osmic acid. Involution forms presented apparent excrescences. The organisms were found at all stages of the disease.

Typhus of Parrots.—Peter, of Paris, ¹⁴, in a clinical lecture, described an epidemic affection that appeared early in the year among a thousand parrots that were brought to Paris from Brazil. Most of the birds succumbed to the disease, of which the essential symptoms were cough and diarrhœa. On the voyage they had been kept between-decks, deprived of sunlight, closely crowded together, and consequently amid most unfavorable hygienic conditions. An analogous affection developed in a number of persons who had come in contact with the birds, and these persons in turn seemed to transmit the disease to other persons. Among the symptoms observed in human beings were malaise, intense pain in the back, violent dyspnoœa, pain in the side, cough without expectoration, flushing of the cheeks, brilliancy of the eyes, prostration, cyanosis, diarrhœa, slight elevation of temperature; there was some impairment of the pulmonary percussion resonance, with bronchial breathing and crepitant râles. In some cases

there was epistaxis, and in some the spleen was enlarged. The elevation of temperature would continue for several days, then abruptly subside, to re-appear, however, after a few days. The opinion is expressed that the disease is one peculiar to parrots and analogous to typhus of a relapsing type. In treatment, quinine sulphate and tonics were employed; ether and caffeine were injected subcutaneously, and wet cups and blisters were applied to the chest.

Cerebro-Spinal Typhus.—Peter, of Paris, ¹⁵²_{July 1} has reported three cases of what he designates cerebro-spinal typhus. Two were in males and one in a female. The last terminated fatally. All had been exposed to unfavorable hygienic surroundings. The principal symptoms were intense headache; vomiting, without nausea; opisthotonos; insomnia; delirium; pain in the back; constipation; herpes of the lips; moderate elevation of temperature. The abdomen was distended; the tongue was coated and tremulous; thirst was marked; the meningeal streak could be developed, being decided and persisting long; rose-spots were absent; spleen and liver were not enlarged; the pulse was dicrotic. In the fatal case a purulent meningitis was found at the post-mortem examination. In treatment, purgatives and quinine were employed, together with counter-irritation at the nape of the neck.

Ollier ²²⁸_{Sept. 15} has reported the case of a man, 29 years old, a miner by occupation, but engaged in cleaning the streets, surrounded by unfavorable hygienic conditions, and supplied with deficient food, who was suddenly seized with repeated chills, accompanied by intense occipital headache. Delirium appeared, with delusions of persecution. The bowels had not been moved for several days. The patient complained of severe pain at the nape of the neck and over the spinal column. The lower extremities were analgesic. The patellar tendon reflexes were exaggerated. The pulse was not accelerated; the temperature was moderately elevated. The area of hepatic percussion dullness was unchanged; the spleen was slightly enlarged. The urine was normal. In the course of the illness the patient had several hæmoptyses, but nothing more than pulmonary congestion could be detected. Later, right hemiplegia appeared, the face subsequently participating in the palsy. Bed-sores developed, and a collection of fluid formed in the right knee-joint. For a time control of the rectal

and vesical sphincters was lost. The patient slowly improved; finally, being able to get up and about. At the end of three months the hemiplegia had not entirely disappeared, but was progressively subsiding.

MALARIAL FEVERS.

Etiology.—Bacelli, of Rome,⁶⁹ states that in some cases of intense malarial fever it may not be possible to detect the presence of pathogenic micro-organisms during the first few days. Even when the organisms are found, they may be present in numbers too small to warrant a belief in a causal relation between their number and the intensity of the febrile manifestations. On the other hand, amœbæ may be present in the blood in large numbers and, if for any reason they have not reached the stage of spore formation, may not of themselves give rise to febrile manifestations. The occurrence of a paroxysm may, with certainty, be predicted if micro-organisms be observed within the blood-corpuscles in process of division or spore formation. With the onset of a new attack, neither the spore-forming nor the newly-formed organisms are to be found. In cases in which paroxysms are induced artificially some, even if of severe type, present no forms of pathogenic micro-organisms within the blood-corpuscles at the onset of the fever. Death may result from indubitable malarial infection, without hæmatozoa having been found in the blood. The injurious effects resulting from malarial infection are to be ascribed (1) to the progressive destruction of the red blood-corpuscles by the activity of a parasite that thrives at the expense of the red cell,—a condition that may be designated a morphologic blood-dyscrasia; (2) to a process that is more rapidly and more profoundly manifested, and by which the products of division and spore formation are thrown into the blood-plasma, constituting a chemical blood-dyscrasia. Mannaberg, of Vienna,⁷⁰ relates that in cases of pernicious intermittent fever he has observed that the crescentic bodies undergo changes in form, becoming at times oval and at other times spherical; the latter possess flagellæ. These bodies are sometimes difficult to find, because present in small numbers. Amœboid bodies contained within the red blood-corpuscles become applied one to another, merge together, and become included within a common membrane, and then undergo segmentation. In this way there result unpigmented crescentic

bodies. Most of the crescentic bodies are structureless, but some have a structure, with the appearance of dividing into two, with two nuclei. In these the pigment is also usually arranged in two groups, either in the shape of a figure of eight, or in two masses, or in two rows. The conclusion is reached that the crescentic bodies are copulation forms of from two to four amœboid bodies. Quinine causes decided changes in the parasites. As early as three hours after its administration the nuclei have disappeared and the plasma has become granular; after the ingestion of more quinine the body undergoes disintegration.

Arnaud²⁴⁸_{Sept.} has reported the results of a study of the blood in 289 cases of various forms of paludism observed in the military hospital at Tunis during the year 1891. There were few cases prior to April. The largest numbers were observed during the months of June, July, August, and September. In the period from January 15th to March 20th no organisms were found in the 21 cases examined; in the period from March 23d to the end of August spherical bodies were most commonly found; while subsequently, spherical, crescentic, and flagellate bodies were found. Of the total number of cases, spherical bodies of various dimensions were found in 141; flagellate bodies in but 1; crescents in 11 (in 2 cases semi-lunar and spherical bodies were present in large numbers); in 23 cases melanæmic pigment alone was found. In 21 other cases small, motile, pigmented bodies, roughly resembling micrococci and provided with one or two flagellæ, were found. These were most frequently present in the months of August and September. It was perfectly evident that there was but one organism, which appeared in many different forms. One case showed successively the various forms and the two modes of regeneration—by fission and by sporulation.

Hehir³⁹_{Nov. 1, 91} gives an excellent description of the life-history of the hæmatozoön of malaria, based upon his own observations. He concludes that the spores of the organism belong to the infusoria, and that they are polymorphous. They may gain access to the blood through the respiratory apparatus, by being inhaled, or through the gastro-intestinal tract, being taken up with water. The spores, once having entered the blood-stream, rapidly infect the red blood-corpuses either by direct entry or (what is much less probable) by a "spermatic influence." The intermediate stage of the devel-

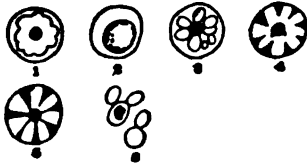
opment now begins, and culminates in the creation within the corpuscles of the spherical organisms, which gradually make their way from the corpuscles, leaving the transparent relics or shells of the red blood-cells behind. The spherical bodies may now develop into one or the other of the following: (a) small amœboid bodies, with excessively fine, actively moving processes; (b) bodies to which Hehir gives the name of *hæmatomonas malaris stellata*; (c) small, free, flagellated organisms; (d) filaria-like organisms of two kinds,—(1) one of considerable length, sometimes reaching $\frac{1}{8}$ inch and extremely attenuated, the breadth, although tolerably uniform, varying from $\frac{1}{1000}$ to $\frac{1}{100}$ inch; (2) another of comparatively great length and breadth, and not very dissimilar to the *filaria sanguinis hominis* of Lewis; (e) large, spherical, or irregularly-shaped flagellated organisms. Each of these five organisms is set free by the disintegration of its containing spherical cell; the limiting membrane or cell-wall gradually becomes more and more indistinct, the granular particles contained within it are seen to separate, and many of them assume the characters of spores. As the process of disintegration advances, the outline and general characteristics of that variety of the organism about to be developed become more and more distinct. Subsequently the fully-developed parasite either sets itself free by its own movements or by the disintegration of the original spherical cell. Now, the constituent spores, granules, and pigment-particles disperse, until at length nothing of the original spherical-cell organism remains. The newly-formed organism at this stage begins an independent existence, but its life is comparatively short, for it does not live longer than four days. In turn, it also undergoes degeneration, giving origin, as a rule, to the smaller varieties of the parasite, especially to the spores and the small, free, amœboid bodies, which are now ready to infect myriads of fresh red cells. With regard to the intra-corpuscular development of the crescentic, pyriform, and trichomonas-like, and other bodies, the first appearance noted is a small thickening (or what looks like a condensation of the hæmoglobin) within the cell, in one, two, or more places. These thickenings run together and form bodies having one or other of the shapes mentioned. The size of this body increases until it approaches that of the containing red cell. One of two things now occurs: either the corpuscle itself gradually

dissolves away (or at least becomes invisible), setting the organism free, or the latter makes its way out of the corpuscle by its automatic activity. In either case the newly-developed organism begins an independent existence, and is seen to be moving about the field. At first it appears to be transparent and highly refractive, and to be unprovided with appendages of any kind. These latter, however, come into view in the form of one, two, or more filamentary, protoplasmic processes, which appear to be attached to the cell-wall. These bodies (crescentic, pyriform, etc.), likewise, in the later stages of their life free, are seen to become granular and contain spores, and eventually to disintegrate. That one series of infected corpuscles should give rise to spherical bodies, and another to crescentic, pyriform, or trichomonas-like bodies, may depend upon the fact that, in the original infection, two or more varieties have gained access to the blood, and each, in its development, produces a mature organism peculiar to the particular variety of spores. In tertian ague, it is argued, it takes forty-eight hours for a generation of *hæmatomonas malaris* to pass through its life-history. In quotidian ague the daily return of fever may be assumed to be caused by a double primary infection at intervals of twenty-four hours, so that two generations of parasites are developing simultaneously; or there may be some idiosyncrasy on the part of the patient that favors a more speedy maturation of the malarial organisms; or the nature of the pabulum upon which the parasite lives is favorable to the rapid growth of development, maturation, and disintegration of the latter. Double quartan ague might be accounted for in the same way, as well as other varieties of ague in which the interval between the paroxysms is less than forty-eight hours.

Dock, of Ann Arbor, ⁴⁶¹ reports a case of quartan fever, with the blood-findings. The attack had existed untreated for two weeks. The paroxysm began with a chill, without pronounced rigor, and with pain in the back and limbs. Vomiting appeared early. With the onset of fever there was dry cough, with yawning, headache, and cyanosis. Sweating did not occur. The spleen and liver were slightly enlarged, and the skin and scleræ were of a muddy tint. At the first examination of the blood, on the second day after the chill, a few plasmodia of medium size were found. These did not differ in appearance from those of tertian fever, though the amœ-

boid movement was rather sluggish. A day later the organisms had become larger, almost filling the red blood-corpuscles. Segmentation began before the temperature rose above 99° F. (37.22° C.), and was complete within an hour, or before the chill occurred. The plasmodia were at all times scanty; on the day after a chill none were found. The segmenting bodies are represented in the illustration. No flagellate bodies were found, and no pigmented leucocytes.

Morbid Anatomy.—Osler ⁷⁹⁴ has reported two fatal cases of malarial intoxication. One occurred in a sailor, 34 years old, who, during a season of hot weather, while in Savannah for a week, had been in the habit of sleeping upon the grass. Vomiting and prostration were the most marked symptoms. The temperature was for a time elevated, but, declining, became subnormal. Examination of the blood disclosed the presence of large numbers



PARASITE OF QUARTAN AGUE.
(*International Medical Magazine.*)

of intra-corpuscular organisms, some pigmented and some not; many leucocytes presented pigment-granules. The urine contained a small quantity of albumen and hyaline and granular tube-casts. Despite the fact that the patient was given $\frac{1}{2}$ -drachm (2 grammes) doses of quinine every six hours (hypodermatically when vomiting became excessive), he died after six days, although the number of organisms in the blood diminished considerably. At the post-mortem examination the spleen was found enlarged and soft; the liver was large, firm, and slate-gray in color; the kidneys were large, the medullary rays pale, the vessels congested; in the stomach were several cicatrices; on the surface of the dura mater, far back on the right side, was a small hæmorrhage; on the middle of the first frontal convolution on the right was a small area of pigmentation in the pia. Microscopically, yellow, irregular granules of pigment were found in the liver-cells; around the capillaries between the liver-cells there were black pigment-grains. In the spleen the pigment-granules were small and mostly free; a moderate number of cells contained red blood-corpuscles. Some of the red blood-corpuscles contained pigmented plasmodia. Yellowish-brown granules were found in the uriniferous tubules, and deep-black granules in the intertubular tissues and in the glom-

eruli. The second case occurred in a berry-picker, who had been exposed to the sun and presented symptoms of insolation. On the seventh day after coming under observation the man had a chill, followed by decided elevation of temperature. The blood was examined, but plasmodia were not found. The pulse became irregular and intermittent; Cheyne-Stokes breathing set in; vomiting occurred; there was slight diarrhœa. The man gradually sank and died. At the post-mortem examination the spleen was found enlarged, softened, and deeply pigmented. The liver was pigmented and myristicated. Both the blood and the spleen contained malarial organisms.

Incidence.—Maureau ²¹²_{July 10} has called attention to the fact that for two centuries the Isle of Réunion had been free from malarial fever. In 1850–52 the disease appeared for the first time, and again from 1869 to 1873, since which time it has been endemic. On inquiry into the facts, it develops that the appearance of the disease coincided with periods of Indian immigration, and, bearing in mind the parasitic nature of the disease, it is argued that its introduction may reasonably be charged to importation. Based upon an experience of twelve years in the West Indies, Pierez, of Antigua, ²_{Jan. 10} makes the statement that negroes suffer quite as much from malarial fevers as other races. The form which they usually manifest is the intermittent, together with pronounced enlargement of the spleen in chronic cases. Remittent fever, on the contrary, is rare among negroes. As a rule, small doses of quinine—2 or 3 grains (0.13 to 0.19 gramme) every three hours—are sufficient to check the intermittent fevers of negroes.

Clinical.—Valdes, of Tucuman, ⁹²⁵_{Jan.} makes three varieties of masked malaria: (1) simple masked malaria, characterized by neuralgia, with irregular remissions and exacerbations in the course of the twenty-four hours, without general febrile phenomena; (2) regular masked intermittent malaria, with a mild initial chill, followed by slight febrile reaction and sweating, and accompanied by neuralgia, recurring daily at the same hour; (3) irregular masked intermittent malaria, in which the manifestations just mentioned appear, but at irregular times. In all three varieties the predominant element is pain. The third is the most commonly observed; the second the most rarely. The latter is amenable to massive doses of quinine, given six or seven hours before the advent of the

attack. In the other two varieties fractional doses of quinine are preferable. Parke⁶ reports that he found quinine useful in warding off the infection of African malaria. Four grains (0.26 gramme) were given as a prophylactic twice a day, for a period of about ten days, to the members of an expedition that traversed a distance of three hundred and fifty miles through one of the most unhealthy regions of Africa, occupying a period of five weeks. It was observed that a wetting of the body, either in wading across streams or by rain; or exposure to a chilling breeze, during or soon after active perspiration; or direct and prolonged exposure to a very hot sun, if the head and spine were not sufficiently protected, was followed by an attack of remittent fever. Each attack was ushered in by a well-defined series of premonitory symptoms. The individual became flushed and talkative, and impatient of contradiction; the eyes were prominent, staring, and glistening; the movement of the limbs was less restrained, so that the dress soon presented signs of more or less disarrangement and the hair became disheveled. The temperature was rapidly running up *pari passu*, its ascent usually preceding other observable signs of illness. With the elevation of temperature the malaise increased, being usually, though not always, proportional to the degree of fever-heat. The muscular pains, especially in the lumbar region, were often quite severe; in the calves they often assumed an intolerable cramping character. Pain in the temporal regions was also an early and often a most distressing symptom, sometimes continuing for one or two days after the subsidence of the temperature. At the commencement of the attack the face always presented a sallow appearance, which was soon replaced by flushing. Often there was no initial shivering (*cold stage*). Respiration quickened with the increased frequency of cardiac action; the latter was strong, often violent. Gastro-intestinal derangement appeared simultaneously with the febrile and circulatory symptoms and progressed with them. Constipation was always marked; there was also flatulent distension of the abdomen, with borborygmi and eructations; vomiting occurred early, and the retching was often very persistent. The ejection of a large quantity of biliary matter was followed by great relief. During the febrile period the tongue was covered by a whitish fur. Defervescence was usually accompanied by profuse diaphoresis (*sweating stage*), the absence of which was

an indication of recurrence. When the three classic stages of ague were present, the first stage was always the shortest, the second the longest. With the initial stage of the fever there was a determination of blood to the abdominal viscera, even when no definite rigor was evident. Coincidentally, the spleen was enlarged. The liver was sometimes tender. There was an increased excretion of urine of lowered specific gravity. In the severe cases the urine became bile-tinged toward the end of a paroxysm. In the early period of the attack the mental faculties were stimulated; ideas flowed more freely, and the individual became more talkative and argumentative. Unless cramps occurred, muscular activity was fairly well preserved, until, perhaps, recurring attacks had brought about weakness. As a rule, the prostrating effects of the fever were very manifest in those cases only in which the temperature failed to reach the normal, *i.e.*, was remittent. In the worst cases the remissions became less and less distinct and the powers of the system rapidly exhausted. The patient wasted and was slow in regaining flesh and strength.

Mackenzie, of London,²_{Feb. 11} has reported a case of malarial intermittent fever, in a sailor 27 years old, in which, on different occasions, the thermometer recorded 113.8°, 112.8°, 112.6°, 110.8°, 109°, and 107.2° F. (45.4°, 44.88°, 44.77°, 43.77°, 42.77°, and 41.77° C.). Extraordinary care was taken to prevent manipulation or deception. On one or more occasions the temperature was taken simultaneously in both axillæ, and the readings were found to correspond. The rigors that occurred were severe, and a short, hot stage was followed by profuse sweating. Except on one occasion, the patient did not seem profoundly ill at the times when the high temperatures were recorded. The periods of hyperpyrexia were exceedingly brief, and this fact may account for their innocuousness. On one occasion pigment-granules were found in the blood. Hare, of King's Inn,²_{Mar. 26} in commenting upon the case reported by Mackenzie, referred to a similar case in a woman, in which it was found that the patient harbored a tape-worm, upon the expulsion of which the symptoms disappeared.

Complications and Sequelæ.—Da Costa has¹⁰¹⁸_{Oct. '91} reported a case of malarial paralysis, in which the accuracy of the diagnosis was confirmed not only by the therapeutic test, but also by an examination of the blood. In addition to the palsy of the

extremities, interesting ocular lesions were found (Harlan, ²⁷¹_{7.1.78} ANNUAL, 1891, vol. i, H-61). There were, besides, headache, impairment of memory, hallucinations, and maniacal delirium. Attention is called to the fact that there may be an intermittent paralysis that is not malarial, and that the manifestations of malarial paralysis are, in the majority of cases, far from being periodic. Three forms are distinguished: (1) general paralysis, or paraplegia, with irregular symptoms; (2) that in which periodicity is striking, which is more commonly hemiplegic; (3) the rarest, in which organic disease is produced by the malarial infection, and in which periodicity and variability are not prominent, the case pursuing much the course of ordinary paralysis when produced by its usual causes. The last form is usually due to a lesion, such as meningitis or hæmorrhage, and manifests itself most commonly as a hemiplegia. Strictly speaking, it is not a malarial palsy, although malarial fever has brought it about. It is rather a palsy in the course of malarial disease. In the treatment of malarial palsies quinine must be given in large doses.

Hill, of West Roxbury, Mass., ⁹⁰_{June 20} has reported the case of a boy, 18 years old, dull, morbid, and melancholic, who, at the time of the anticipated chill in the course of an attack of malarial fever, was seized with convulsions. The temperature rose to a considerable height, and the convulsions continued for several hours, notwithstanding the administration of chloroform, amyl nitrite, and nitro-glycerin. Quinine and bromides were also given, but the paroxysms recurred and terminated fatally. In a second case, in a boy 9 years old, numerous paroxysms of convulsions occurred in the course of a malarial attack. In a second attack of malarial fever the convulsions recurred and were repeated on alternate days for a number of days, finally ceasing and recovery ensuing. Subsequently, however, paroxysms would occasionally occur at night.

Combemale ⁷³_{July 16} has reported the case of a man, 42 years old, who, for a period of ten years, had been exposed to malarial infection, and presented motor, sensory, and trophic symptoms that pointed to the existence of a multiple neuritis, which resisted treatment with quinine, but yielded to electric treatment.

Rosenfeld ³⁴_{Sept. 30} describes the case of a girl, 3 years old, who, for several days toward evening, had attacks of chills and fever, and who, for a day, presented torticollis, with the head turned to the

right. The sterno-mastoid and the other muscles of the neck were sensitive to touch. The condition is believed to have been a result of malaria. Other persons in the same house likewise presented symptoms of malaria.

Bagot^{171, 2}_{Jan., Feb. 20} has reported three cases of malarial fever with ocular complications. The first case occurred in a mulatto boy, 15 years old, who had a severe attack of bilious remittent fever, with gastrointestinal symptoms and coma, lasting for two or three days. Immediately afterward his sight began to fail, and three months later he had soft cataract in both eyes. The second case was in a mulatto girl, 16 years old, who also had a grave attack of malarial fever lasting for three days, immediately following which vision began to fail; nine months later there was soft cataract in both eyes. The third case was in a little white girl, who had an attack of malarial fever, with delirium, convulsions, and loss of consciousness, lasting two days; then for a day there was complaint that vision was red; subsequently sight rapidly failed, and on the fifth day the child was entirely blind. An incomplete ophthalmoscopic examination disclosed the existence of retinal hæmorrhage upon both sides, in the region of the macula. A year later both discs were atrophied; there was perception of light with the right eye; there was a slight degree of vision upon the left, with fairly good color-perception.

Krafft-Ebing^{113, 886}_{Nov. 1, June} has reported the case of a man, 29 years old, who, during a febrile attack two years after an attack of malarial fever, fell and received a slight injury over the right mastoid process. After this, attacks of unconsciousness, followed by stupor and delirium, occurred with progressively increasing frequency. Observation showed that the attacks were repeated on alternate days. There was usually an aura; then clonic convulsions, followed by stupor or delirium, or both. The temperature was usually elevated after the attacks. The attacks were controlled by the administration of 1 gramme (15 grains) of quinine bisulphate daily; subsequently the dose was reduced one-half. After dismissal, the attacks recurred, but they were soon dissipated by the administration of large doses of quinine and solution of potassium arsenite.

Hadji-Costa⁹²_{Nov. 11, 91; Feb. 6} has recorded ten cases of pneumonia in individuals presenting a history of malarial infection. His obser-

vations lead him to believe that chronic impaludism predisposes to the development of a pneumonia characterized by a special train of symptoms. The invasion is usually insidious. The classical symptoms of a frank pneumonia, such as dyspnoea and pain in the side, are mild or wanting. In addition to the chronic congestion of the miasmatic affection, organic and functional derangements of the abdominal organs are common. Nervous and adynamic symptoms predominate. Resolution is often delayed. Suppuration may ensue. The mortality is high. Treatment by means of quinine and alcohol exercises a most favorable influence upon the course of the disease.

Bowie⁶,_{Sept. 11} has reported the case of a tall, finely-built cavalry soldier, 30 years old, in Africa, who, having a morbid dread of African fever, determined to return to his home in Scotland. He had had several attacks of fever and was again seized. The man was exceedingly anxious about himself and suffered much from fear. The spleen was slightly enlarged. Following a chill and before the hot stage had set in, the man complained of severe pain, which he referred to his heart. He failed to sleep during the night. Retching was constant, a little greenish-yellow fluid being occasionally brought up. In addition to the pain referred to the heart, there was also pain in the loins, with an inability to pass urine, notwithstanding a desire to do so. The bowels had been moved twice, the stools consisting of a little dark-colored liquid. The expression was anxious, the face dirty-gray, the features somewhat pinched, the lips livid and pale, the eyes clear and the pupils dilated. The patient complained of intense thirst. There was pain in both hypochondria. The pulse could be felt, but not counted; the heart-sounds were faint and indistinct. The abdomen was tense above the umbilicus, but below it was soft and could be manipulated without pain. Pressure in the hypochondria elicited pain, in greater degree upon the left. By means of the catheter, an ounce of dark-yellow, slightly turbid urine was removed from the bladder; chemical tests disclosed the presence of albumen. Under stimulation the patient rallied slightly, but death finally occurred. When the abdomen was opened, a large amount of liquid and clotted blood was brought to view. This had evidently been poured out from the spleen, the capsule of which was found to be ruptured, although the organ was scarcely larger than normal.

Hodge²⁸⁵ has reported a case of adynamic remittent fever, in the course of which a copious petechial eruption appeared upon all parts of the body except the face. The bowels had been constipated. There was some cough, the tongue was red and irritable, and there was complaint of general pains. The patient was considerably prostrated and groaned a good deal. He presented no peculiar odor. Recovery followed treatment with mercurials and quinine.

Treatment.—Golgi, of Pavia, ⁶⁹July 21, 28; Aug. 4, 11 has made an elaborate study of the action of quinine upon the parasites of malaria. He found that the employment of the drug, either by the mouth or subcutaneously, or injected into the veins, so that the remedy came in contact with the parasites at a time when the internal processes that lead to segmentation (spore formation) have already begun, did not inhibit the development of the parasites, and was thus incapable of preventing the appearance of the next febrile paroxysm. As the changes spoken of must take place earlier than they can be recognized, it cannot, with absolute certainty, be stated for how many hours before the anticipated attack the activity of the quinine is not manifested. Given three, four, five, and even from six to ten hours before the paroxysm the drug exerts no influence upon the colony of parasites approaching maturity. If quinine be given under the conditions already named, although it does not affect the parasites or does not prevent the succeeding paroxysm, it exerts a pronounced influence upon the new generation of parasites, which are destroyed if the dose of the drug be large enough. It is upon this action that is based the direction that quinine be given three, four, or five hours in advance of the paroxysm. It is not desirable to increase this interval, as otherwise, undergoing elimination, the quinine might not remain in sufficient quantity to destroy the new generation. It is not so well to give quinine after the paroxysm, as thus time may be given for the new generation of parasites to gain entrance into the red blood-corpuscles. There can be no objection to giving quinine at this time, if the administration is repeated. If quinine be given so that it finds its way into the blood at a time when the parasites are in the stage of the small endo-corpuscular amœbæ (in quartan fever on the first day of the apyrexia), it is capable of interfering with the development of the parasites, and it may at times attenuate or retard the next par-

oxysm ; but it cannot be depended upon to neutralize the infection. The interference with the development of the organisms bears a certain relation to the size of the dose. If full doses are given repeatedly during the apyretic stage, not only may the next paroxysm be aborted, but the infection may also be neutralized. The phase of development in which the endocorpuscular parasites are most readily affected by quinine, and in which the probability of aborting the next paroxysm is greatest, is that in which but a small area of the body of the parasite remains (in quartan fever toward the end of the second day of the apyrexia); the neutralization of the infection is, however, less certain and safety from relapse slighter. The practical outcome of these observations is, that quinine should be given in a full dose three, four, or five hours in anticipation of a paroxysm and for several successive days. In the fevers of irregular type quinine should be given uninterruptedly for weeks.

Martin, of Green Grove, Miss., ¹² makes a warm plea for the non-employment of quinine in cases of malarial hæmaturia. He considers the damage done, and the malarial parasite beyond the reach of medication, when the hæmorrhage has taken place. While ordinarily, when quinine is given, malarial hæmaturia is considered a grave disease, of which from 20 to 50 per cent. of the victims die, and relapses are common and convalescence is slow in those that recover, it is contended that, if quinine be not employed in treatment, the prognosis is by no means so discouraging, relapses are uncommon, and convalescence is rapid. It is recommended that turpentine be given, that the bowels be kept open, preferably with salines, that the nutrition be scrupulously maintained, that iron be given, and, when convalescence has set in, that arsenic be administered.

Buro ^{622, 189}_{No. 51, Apr.} divides antipyretic drugs into three groups, according to their action: (1) those that act in the apyretic interval, *e.g.*, quinine; (2) those that act during the febrile period, *e.g.*, sodium salicylate; and (3) those that act at all times, *e.g.*, eucalyptus. Particularly in private practice is the use of quinine attended with the objection that the facts in a given case must be obtained from the patient; that the apyretic intervals are sometimes so short that the action of the drug appears too late; and that, when inflammatory and catarrhal conditions are present in

addition to intermittent fever, quinine usually fails. Eucalyptus, on the contrary, acts favorably under these conditions. The most certain and the best results are most speedily obtained if the drug is injected beneath the skin. It is well to mix the ethereal oil with a fatty oil, and to give doses of from 0.1 to 0.3 gramme ($1\frac{1}{2}$ to $4\frac{1}{2}$ grains). In some cases relapses occurred that yielded only to quinine. Sasse⁵⁸³_{Jan. 20, Apr. 26} recommends the employment of cinchonine when quinine cannot for any reason be taken. Cinchonine has a further advantage over quinine in that it is the cheaper. It is given in corresponding doses. The drug may be administered in simple syrup, but preferably not in a single dose, as it may cause vomiting. The tinnitus aurium and the oppression of the chest observed after the taking of quinine are not observed after the administration of cinchonine. On the other hand, the use of cinchonine is followed by dryness of the nose, mouth, and throat, with paresis of the accommodation, without alteration in the size of the pupils. After an extensive experience in Syria, Gemayel⁶⁷_{Dec. 20, '91} strongly indorses the utility of cinchonidine sulphate. He found the drug quite as certain, as rapid, and as efficacious as quinine, and particularly valuable in cases in which quinine was for any reason contra-indicated or could not be taken. As a rule, 1.5 grammes (23 grains) were administered on the first, the second, the fourth, and the sixth days of the first week and on one or two days of the second week. It was usually administered at bed-time. In chronic malarial infection arsenic, iron, and hydrotherapy proved useful therapeutic adjuvants.

Mya³⁷⁶_{Dec. 21, '91; Mar. 19} has employed methylene blue in nine cases of malarial fever. In some of the cases it had a decided effect upon the course of the fever, but in the majority the effect was slight or but transient. Methylene blue is objectionable on account of the severe gastric pain, pyrosis, and strangury to which it gives rise; it also displays a tendency to diminish the quantity of urine excreted.

Thayer⁷⁶⁴_{Feb.} reports five cases and refers to two others, in all of which hæmatozoa were found in the blood, and in which successful therapeutic results were obtained by the administration of methylene blue, in doses of 0.1 or 0.2 gramme ($1\frac{1}{2}$ to 3 grains) five times daily. It is admitted that the number of cases is too small to draw definite conclusions from the results. In all of the cases

in which methylene blue was given alone, strangury developed in the first three days, which was, however, at once relieved by the administration of from 10 to 20 grains (0.65 to 1.3 grammes) of powdered nutmeg. In the cases in which nutmeg was given from the outset no unpleasant symptoms appeared. In all of the cases the urine was of a deep-blue color; in none, however, did it contain albumen. The fæces, though untinged when passed, became blue on exposure to the air. The sweat and the saliva, however, did not appear to be colored. The same author⁷⁶⁴ reports 7 additional cases in the treatment of which he employed methylene blue. Of these, 2 were cured; in 2 more a definite cure may have been obtained; in 2 others immediate temporary benefit was noted, followed, however, by an increase in the number of organisms and a return of fever, but finally yielding to quinine; in the seventh case the symptoms remained in abeyance for twenty-two days, although the organisms never entirely disappeared from the blood. The conclusion is reached that, while methylene blue exerts a definite influence in the treatment of malarial fever, by a destructive action upon the specific organism, it seems to possess no advantage over quinine that would warrant its further use. Boinet and Thintignan,¹⁴ also report the successful employment of methylene blue in the treatment of malarial fevers. They administered from 0.50 to 1 gramme ($7\frac{3}{4}$ to $15\frac{1}{2}$ grains) daily, in pills, for a period of two weeks. In the acute stage of grave cases, 1.5 or 2 grammes (23 to 31 grains) were given at once, and repeated if necessary. No unpleasant complications were observed. The urine was increased in amount, and remained discolored for five days after the withdrawal of the drug.

Huddleston, of New York,⁵⁹ describes the cases of three sisters, 10, 7, and 5 years old, respectively, with chills, fever, and sweats on alternate days, plasmodia being found in the blood of the eldest. Each was given methylene blue (0.1 gramme— $1\frac{1}{2}$ grains), the eldest every three, the second every four, and the third every five hours during the waking period, for four days. The urine was colored blue, but was passed without difficulty. The blood was examined after four days, but no parasites were found; neither did the children have a recurrence of the symptoms.

Mühl, of Basle,²¹⁴ has reported the case of a man, 38 years old, who presented symptoms of quotidian intermittent fever, with

plasmodia in the blood, the febrile stage occurring between 8 and 9 o'clock in the morning. Five capsules, each containing 0.1 gramme ($1\frac{1}{2}$ grains) of methylene blue, were given toward evening, without apparent result. Following the second five, the temperature subsided to normal, not again to rise. After three weeks, the spleen was not enlarged, although plasmodia were still present in the blood. The patient had gained in weight; the number of red blood-corpuscles and the amount of hæmoglobin had likewise increased. There was no strangury or other discomfort. The urine was blue four hours after the taking of the first dose. In all, 3 grammes (46 grains) of methylene blue were taken.

Laveran³ has made a study of the blood of pigeons treated with injections of methylene blue, and failed to find any changes in the hæmatozoa, which are closely allied to those found in man. The same negative results were obtained in two cases of malaria treated in a similar manner.

Burg⁹²² ¹⁵² has employed the alkaline nitrates in the treatment of the malarial fevers. The potassium and sodium salts act much alike; the former is, however, the less toxic and the more soluble. In adults an ordinary dose is from 1 to 1.5 grammes ($15\frac{1}{2}$ to $23\frac{1}{4}$ grains), which is best administered in the interval between attacks or at the onset of an attack. The results of the treatment were variable; it succeeded in some cases and failed in others. The nitrates possess the advantages of ease of administration, of absence of disagreeable taste, and of not deranging the digestion, or occasioning symptoms referable to the nervous system.

From personal experience, as well as from the testimony of others, Déclat¹⁷⁵ recommends the employment of carbolic acid in the treatment of the various forms of malarial fever. In the hot stage he makes two injections beneath the skin of 100 drops of a 2.5-per-cent. solution of pure carbolic acid in aseptic hydrated glycerin. If the paroxysm is repeated, 100 drops of a corresponding solution of ammonium phenate are injected; and the injection may be repeated for several days after the last attack. For several days after the disappearance of the fever 2 or 3 teaspoonfuls of a 1.5-per-cent. syrup of carbolic acid may be given daily. In rebellious cases recourse may be had to injections of a 5-per-cent. solution of quinine phenate in sterilized oil.

Ranson¹⁹⁵ ⁹⁹⁸ ⁸⁰ reports the successful employment of an
Dec., '91; Feb. 10; Apr. 15

infusion of kinkélibah, or *Combretum raimbultia*, an arborescent plant that grows in Western Africa, in the treatment of severe cases of remittent fever in the Soudan. The leaves of the plant can be dried and be preserved for years without losing their active properties. They are reduced to powder, and an infusion of 1 drachm (4 grammes) to $\frac{1}{2}$ pint ($\frac{1}{2}$ litre) of water is made. At the onset of the attack, particularly if there is hæmaturia, a wine-glassful may be given every ten minutes; vomiting results, and favorable symptoms follow the remission that takes place. Subsequently quinine is given.

Albertoni⁵⁹⁹ has tried phenocoll in 34 cases of malarial fever. Of these, 24 were permanently cured; in 5 the results were doubtful; in the remaining 5 no good was accomplished. In some of the successful cases quinine had been employed without avail. Phenocoll was given in doses of 1 gramme ($15\frac{1}{2}$ grains), in powder or in solution, from five to seven hours before the expected paroxysm, and was continued for some time to prevent relapses. The use of the drug was attended with no unpleasant effects; its taste was readily masked by sugar.

VARIOLA.

Incubation.—Schnell⁴⁶ has reported the case of a woman admitted to hospital with symptoms thought to be of malarial origin. After a day, a variolous eruption appeared, and the patient was at once isolated. Fourteen days later, another woman, occupying a bed in the ward in which the first patient was received, was seized with fever, pain in the back, and vomiting, and a variolous eruption appeared on the following day. On the same day another woman in the same ward became ill, a variolous eruption appearing two days later. The two secondary cases were able to be out of bed during the day, and may possibly have come in contact with the original case of variola.

Clinical.—Biedert³⁸⁸ emphasizes the occasional difficulty of differential diagnosis between varicella and modified variola, the one affection at times being unusually violent, while the other is sometimes exceptionally mild. From a considerable experience, he has found that before the stage of eruption variola is little or not at all contagious, and varioloid even less contagious than variola. Some individuals, even when not vaccinated, are but slightly

susceptible to infection with variola; while others are so strongly predisposed that vaccination will succeed after an interval of one or two years. In most persons the protection afforded by vaccination lasts for seven years; in some, even longer. The protective influence begins about a week after successful vaccination; vaccination after infection has taken place does not protect, but vaccination practiced seven days before the appearance of the eruption may favorably influence the course of the attack. Children should be vaccinated early and repeatedly, as they may readily be the means of spreading the disease. The greater the number of unvaccinated and not revaccinated persons in a community, the greater the danger of outbreak and spread. Isolation and disinfection can only aid in the control of an epidemic when conjoined with immediate vaccination of those that come in contact with cases. Thorough ventilation, as well as sufficient movement in the open air and change of the outer clothing on the part of those that come in contact with the sick, will diminish the danger of contagion; the danger can only be removed by disinfection of all personal effects by means of steam. Treatment with the fumes of sulphur exerts a beneficial influence.

Spehl ⁸⁶⁸_{Dec. 5, '71} has reported two cases of malignant hæmorrhagic variola during an outbreak of rather mild character. One occurred in a woman, 47 years old, vaccinated in infancy, but not revaccinated, who had been under observation on account of an attack of acute articular rheumatism, with a tendency to recurrence. The woman finally seemed about to improve, when, two months after she first came under observation, a diffuse scarlatiniform eruption appeared, together with severe pain in the back. The temperature rose considerably, and the urine contained a small quantity of albumen. To the redness swelling was added; and soon a number of vesicles, of variable size and filled with blood, made their appearance, together with numerous small, hard, bluish-black papules. Three days after the onset the patient died. At the post-mortem examination extravasations of blood of various volume were found: into and beneath the skin, in the lungs, beneath the conjunctiva, between the muscles, in the joints, in the mesentery, and beneath the mucous membrane of the stomach and intestines; the left pleural cavity and the pericardial cavity contained blood-tinged effusions. Several of the joints presented inflammatory changes

of a destructive character. The case was considered to be one of hæmorrhagic variola with purpura. The second case occurred in a man, 36 years old, likewise vaccinated in infancy, but not re-vaccinated, who, after five days of headache and backache, presented a scarlatiniform eruption, soon followed by a diffuse red-wine coloration of the surface. The constitutional symptoms were correspondingly profound. There were no papules. The man died twenty-four hours after the appearance of the eruption and five days after the onset of the first symptoms. At the post-mortem examination extravasations of blood were found beneath the conjunctiva, the pleura, and the mucous membrane of the gastro-intestinal tract. Bloody fluid was also found in the genito-urinary tract. The case may be considered as one of purpuric variola. Gasparini ⁶¹⁶ _{no. 16}, ¹⁷ _{July 1}, has observed uterine hæmorrhage in female children suffering with variola who had not previously menstruated. He has likewise observed similar hæmorrhage to take place in women that had already passed the menopause. Abortion occurring in the course of an attack of variola is usually attended with more than the ordinary amount of hæmorrhage. Amenorrhœa is the rule in women that have safely passed through an attack of variola. The secretion of milk is suppressed in nursing variolous women. Desrèze ⁶⁰⁸ _{May 7} calls particular attention to a petechial eruption that may appear early in a case of variola, sometimes before the usual eruption is sufficiently well defined to be of diagnostic significance. The petechiæ have their seat of predilection in the groins, in Scarpa's triangle, and on the lower portion of the abdominal wall. The spots are about as large as pinheads, do not disappear on pressure, and have a tendency to coalesce, without, however, forming a perfectly continuous eruption. They disappear as the regular eruption makes its appearance. The petechiæ seem to be most common in neurotic patients; they are apparently of favorable prognosis, not being observed in grave cases; they appear in situations in which the ordinary eruption does not subsequently appear. On the anterior aspect of the chest, near the axilla and the lower border of the great pectoral muscle, the pustules undergo early umbilication.

Variola in the Fœtus.—Lambinon ²⁵⁶ _{June 16}, ² _{July 20} has reported the case of a primipara, 24 years old, vaccinated in infancy, who was attacked with discrete variola in the sixth month of pregnancy and

made a good recovery. Foetal movements were, however, thereafter no longer perceived. In the seventh month labor set in, the feet presenting. The membranes were ruptured, and the child was extracted. It was in a state of advanced maceration, and presented characteristic variolous pustules on the back, arms, and thigh, the face escaping. The placenta came away ten minutes after the expulsion of the child. The uterus contracted poorly, so that an intra-uterine douche of hot water and a subcutaneous injection of ergotin were given. The woman made a good recovery, and was dismissed on the ninth day.

Accidental Cow-pox.—Sympson, of Lincoln, ²_{Jan. 10} describes the case of a farmer's wife, who, several days after milking the cows and pricking a finger, noticed a small, hard, painful pimple at the point of injury. Soon the hand began to swell and the pimple to enlarge. Then fever set in and rigors occurred. As it was thought that the pustule was dependent upon the presence of a thorn, an incision was made, but no pus was found. The pustule became transformed into a vesicle. The arm became swollen and the lymphatics prominent. The temperature was high, the tongue was coated, and there was headache and nausea. The axillary glands became enlarged. After running a course of ten days the symptoms began to subside, and the condition gradually improved. A prominent cicatrix marked the seat of the local process. On investigation, it was learned that one of the two cows that the woman had milked had, four weeks previously, presented a number of pimples on the udder and teats; these became blisters, which were ruptured in the process of milking. The teats became large and swollen. Dark-red scabs appeared on the sores; on disappearing, leaving well-marked scars. Then the second cow went through the same stages. In both instances the milk was greatly lessened in quantity and poor in quality, and was thrown away. The woman had not been vaccinated since infancy.

Diagnosis.—Freyer ⁵⁸_{Aug. 20} has conclusively demonstrated the non-identity of variola and varicella. He obtained the contents of some twenty vesicles from an undoubted case of varicella, rubbed up the fluid in a mortar, together with a little glycerin, and, with the mass, inoculated a calf. A little redness appeared at the point of inoculation, but nothing like the result that follows inoculation with the contents of a variolous pustule. Eight days after the

inoculation with the varicellous fluid the same animal was inoculated with vaccine, responding in the characteristic way. Freyer also relates that he repeatedly vaccinated successfully children who had recently had varicella, in some cases the crusts still being present. Two children actually developed varicella after the vaccination had proved successful.

Complications.—Sottas ¹⁰⁰_{Apr. 12} has reported the case of a man, 18 years old, with a good personal history, but of whom the mother, a brother, and a sister were epileptic, who, during an attack of discrete variola of moderate intensity, presented symptoms suggestive of meningitis. He became comatose and generally paralyzed; speech was slow, but dragging rather than scanning, consonants being articulated as in bulbar paralysis; the tongue was moved sluggishly, and presented fibrillary movements at the tip. There was slight nystagmus, without tremor of the head. The patient had greatly emaciated. The paralysis gradually disappeared, and was replaced by inco-ordination of movement, with intention tremor. The reflexes were exaggerated, and a tendency to contracture developed. In the course of time the clinical picture of cerebro-spinal sclerosis became better defined. The function of the sphincters was preserved. Sensibility was not deranged. Trophic symptoms were not present. Intelligence was impaired. Combemale ³⁶⁰_{Jan. 2} has reported the case of a girl 20 years old, in which, on the twelfth day of an attack of variola attended with high temperature and marked delirium, a certain slowness of speech was noted; the voice was somewhat nasal in character, and there was slight transitory strabismus. The uvula deviated to the left and was insensitive. There was considerable difficulty in formulating answers to questions. On the twenty-fifth day the difficulty in speech persisted and the left upper eyelid drooped a little. The labial and dental letters were poorly enunciated. After two months considerable improvement had taken place. Destrée ⁸⁸⁶_{May 7} has recorded the case of a girl 5 years old, never vaccinated, in which, in the midst of convalescence, about ten days after the establishment of the period of desiccation, paralysis of the right arm was observed, lasting for three weeks, and then gradually disappearing under tonic treatment.

Variolo-Vaccinia.—By inoculation of calves with the virus of the pustules of variola and transmission through several genera-

tions, Haccius and Eternod,¹⁹⁷_{July 20} have succeeded in producing pustules indistinguishable from those of true cow-pock, the virus of which, when inoculated upon human beings, gave rise to vaccinia. Man or lower animal, inoculated with either virus, is protected against the other. The conclusion to be drawn is, that the virus of variola, in passing through the animal organism, undergoes some transformation or modification, as a result of which it is deprived of its malignity. Hime, of Bradford,²_{July 16} has repeated the demonstration that cow-pock is but modified small-pox, and that the two are reciprocally protective. By inoculating a calf with the contents of variolous pustules, he succeeded in bringing about pronounced constitutional manifestations, with the appearance of a typical variolous eruption; and, by inoculating human beings with the contents of these pustules, he was able to produce a typical vaccinia. Inoculation of the calf with good fourth-day calf-vaccine proved unsuccessful, indicating that the animal had been rendered refractory by its previous variolation. A second calf, inoculated with virus obtained from the first, developed typical cow-pox. Matter from this animal also demonstrated its ability to induce vaccinia in the human being. An attempt to vaccinate one of the children previously inoculated with some of the matter from the second calf proved unsuccessful, in demonstration of the protective influence of the inoculation. A third calf was successfully inoculated with matter from the second calf, and a fourth calf from matter obtained from the third.

Vaccination.—Boucher²⁰⁸_{Mar. 1} has reported the case of a child, 6 months old, in a family in which two sisters were convalescing from mild attacks of variola, who presented a temperature of 40.4° C. (104.7° F.), with sleeplessness, agitation, and incessant vomiting. The day before there had been a red eruption upon the chest that had been thought to be scarlatinal. The child, as well as other members of the family, was at once vaccinated. On the following day an almost confluent variolous eruption appeared upon the face and, a few days later, upon the abdomen and thighs. In the course of a week, however, the child was practically convalescent. It had previously not been vaccinated, and it is only reasonable to ascribe the mildness of the attack to the vaccination practiced at the onset. None of the other members of the family was attacked. Gill, of Clifton,²⁶_{May 1} has prepared a

table of 288 cases in which pitting after small-pox was present, encountered among more than 10,000 patients of both sexes, at all ages. Of the 288, 158 had not previously been vaccinated; of these, 132 were badly marked. Of 98 in which it was stated that vaccination had been practiced, 63 were badly marked. If additional evidence of the utility of vaccination were wanting, it is to be found in the report of an epidemic of variola by Destrée.⁸⁶⁸ Of 185 cases, 16.6 per cent. were never vaccinated, 78 per cent. were vaccinated in infancy, and 5.4 per cent. were vaccinated more than once. Of the first group, 37 per cent. terminated fatally; of the second group, 2.4 per cent.; and of the third group, not one died.

Treatment.—Having observed that the saliva, in cases of variola, is both abundant and of acid reaction, and that the pustules that form in the mouth disappear earlier than those elsewhere, and without leaving cicatrices, Coste,⁸⁷ of Marseilles, concluded to employ boric acid topically, for the purpose of preventing disfiguring cicatrices. Upon the face he placed a large piece of borated lint, provided with openings for the eyes, nose, and mouth, which he saturated, by means of a spray, with a solution of boric acid. Over this was applied a second layer in the same way as the first, and over the second a third. The irregularities of the face were filled in with pledgets of cotton saturated with boric-acid solution. All were covered with a sheet of wax-paper or rubber cloth, and the entire dressing was held in place by a gauze bandage. The hair of the face must, of course, have been previously cut close. It was necessary to spray the coverings of the face every four or five hours. That next to the skin is to be removed as soon as it becomes soiled. By this means the intensity and duration of the eruption were favorably modified and cicatrices did not appear in the treated parts. The application is kept up throughout the entire period of the eruption, the coverings being kept continually moist.

Casas Abril,^{632, 41} has reported the employment of carbolic acid in 44 cases of variola, with 3 deaths (in cases of hæmorrhagic confluent variola). By the side of each patient was placed an open vessel containing carbolic acid, and the floors were sprinkled with a solution (1 to 100) of the acid. Diaphoretic drinks were given without restraint. At first a vegetable diet was

given, but during the period of desquamation nutritious broths and fowl were directed. Carbolic acid was administered internally, in doses of from 1 to 2 grammes ($15\frac{1}{2}$ to 31 grains) in the course of twenty-four hours, in sweetened water. Pills are to be avoided, as, when the stomach is empty, they may act with caustic effect. The utility of the method of treatment manifested itself in the reduction of temperature during the continuance of the administration; in diminution in the frequency, with increase in the strength, of the pulse; in limitation of the extent and duration of the exanthem and of the process of suppuration; in many cases of confluent variola the pustules underwent contraction and desiccation in the course of a few days; in advanced cases the exanthem was but little modified, but the pyrexia and the general condition were favorably influenced; complications were uncommon. As a rule, patients take the drug with readiness. To the face, local applications of a 1-to-1000 solution of mercuric chloride were made. Ocular and aural complications likewise responded to treatment with a 1.5-to-1000 sublimate solution.

THERMIC FEVER.

Coplin, Bevan, and Sommer, ⁹₁₈₉₂ of Philadelphia, report the results of observations made upon men working in a sugar-refinery during an unusually hot period. About 800 men were on duty by day and 500 by night. The temperature in different parts of the refinery varied from 95° to 165° F. (35° to 73.9° C.). Some of the men worked constantly in temperatures of from 115° to 118° F. (46.1° to 47.8° C.). The work, while laborious, was so arranged that continuous employment in very hot places was not required. During eight days 213 men were affected in varying degree: 183 of these were soon able to return to work after a little attention; 28 were sent to their homes, 2 to a hospital; 1 died. In the fatal case the temperature reached 110° F. (43.3° C.); in a case that recovered, the temperature reached 108.8° F. (43° C.); in 7 cases it rose above 107° F. (41.7° C.); in 11 cases above 106° F. (41.1° C.); in 10 between 105° and 106° F. (40.6° to 41.1° C.); in the remainder the temperature reached lower levels. The great majority of the cases occurred in the boiler-room and in another room in which the raw sugar was emptied into a melting-reservoir, in two apartments of which the

humidity was relatively high. It became perfectly clear that a higher degree of heat could be borne if the atmosphere were dry than if the atmosphere were moist. There was no evidence that those men who drank beer suffered in greater number or greater degree than those who abstained. Those who drank largely of water appeared extremely prone to suffer. The most common and the most distressing symptom was "cramp," usually referred to the epigastrium, and which was not infrequently associated with a similar sensation in the calves of the legs, occasionally in the back, sometimes also in the hypogastrium, less commonly in the thighs and in the upper extremities. There was also complaint of difficulty in respiration, as if from a weight upon the chest. Occasionally there was pain in the splenic and hepatic regions. Headache was present in almost all of the cases. In some cases there was nausea; vomiting rarely occurred. Only exceptionally was the surface temperature high. The axillary temperature could not be depended upon: in the one fatal case the axillary temperature was 105° F. (40.6° C.), at a time when the rectal temperature was 108° F. (42.2° C.). In a few cases diarrhœa was present; in the majority the attack was preceded by constipation. Consciousness was, as a rule, preserved until the temperature reached 106° F. (41.1° C.) Delirium and convulsions sometimes preceded loss of consciousness. In many cases the pulse was irregular and gaseous and the rhythm of the heart was disturbed. The urine was scanty and high-colored, and when the pyrexia became excessive transient albuminuria appeared in some cases. Pain in the back was almost invariably present, and a few cases presented girdle-pains. Patients were not, as a rule, cognizant of their temperature; many felt cold when removed from the heat. The guiding principle in treatment was to increase the peripheral circulation.

In all cases the routine treatment that was employed is summed up as follows: After having been removed to a room specially provided for the emergency, the temperature was taken and the patient was placed in a low bath-tub, of which the water was of the same temperature as the body; he was then rubbed with large, gritty sponges until redness of the skin was induced; this was followed by a spray of water of a temperature of 45° F. (7.3° C.). After five or ten minutes the patient was removed from

the bath and again rubbed with sponges. If the temperature was not reduced to 100° F. (37.8° C.) the bath was repeated.

Meanwhile the man had been given by the stomach or beneath the skin $\frac{1}{20}$ grain (0.003 gramme) of strychnine, $\frac{1}{40}$ grain (0.0015 gramme) of atropine, $\frac{1}{8}$ grain (0.01 gramme) of morphine, and 20 drops of tincture of digitalis, followed by a teaspoonful of aromatic spirit of ammonia in a glass of milk. Nausea was best combated with cracked ice. Amyl nitrite was employed in but one case, with most gratifying results, the dose given being 3 minims (0.18 gramme), and it is thought that nitroglycerin might be advantageously employed in cases of thermic fever. Headache was relieved by applications of ice to the head. In mild cases, in which the temperature did not rise above 101° or 102° F. (38.3° or 38.9° C.), 5- or 10-grain (0.32 or 0.65 gramme) doses of antipyrin or antifebrin relieved the headache. In the majority of cases alcoholic stimulants were administered. In one case, in which cyanosis appeared, bleeding was resorted to, 8 ounces (240 grammes) of blood being withdrawn and the patient recovering. After the cessation of active treatment the men were placed beneath a cold-air blast, active friction of the skin being meanwhile maintained. In the cases in which the temperature was subnormal the treatment consisted in the administration of alcoholic stimulants or hot drinks and rest in the recumbent posture.

Kant, of Gerabronn, ¹³³_{June 15, 20} has reported 10 fatal cases of insolation, occurring in the course of two days in a community of 30,000 inhabitants, the larger number of which was employed in agricultural pursuits. There had been no cases of insolation in the community during the preceding six years. In the year in question, after a season of but moderate temperature, there was a rather abrupt increase of the heat, together with decided humidity of the atmosphere, at a time when the people were, from industrial reasons, compelled to be unusually active in their work. In addition, in the 10 fatal cases, it was ascertained that there had been special factors of individual predisposition, such as excesses of one kind or another or previous disease. Of these cases, 6 were in females and 4 in males, all between the ages of 17 and 68; 8 were between 18 and 30; 2 over 60. In all, death resulted in the course of from half an hour to eight hours. In 8 consciousness

was lost and did not return. An additional factor is apparently wanting to explain the occurrence of a large number of cases at one time; this may reside in unusual telluric or atmospheric conditions, or possibly in a miasmatic or micro-organismal infection. In a prophylactic way, when the conditions favorable to the occurrence of insolation exist, the indications are to do the day's work in the early morning hours; to interrupt the work by intervals of rest; to permit the taking of stimulating drinks free from alcohol, such as tea and coffee, in addition to water in abundance; to retire early to bed; and to insist upon the sick and the weak remaining within doors.

Williams, of Philadelphia, ¹⁹, has reported the case of a man, 27 years old, a workman in a sugar-refinery, who had been overcome by the heat and presented a temperature of 110° F. (43.3° C.). There had been convulsions and the bowels were moving involuntarily. The pulse was scarcely perceptible at the wrists. By vigorous treatment with ice-enemata, ice-rubbing, digitalis, whisky, and strychnine, the threatening symptoms were relieved. The urine was found to contain albumen and hyaline, epithelial, and granular tube-casts. The knee-jerk could not be elicited upon the left, and the face was somewhat drawn upon the right. The right pupil was a little larger than the left. Ten days after coming under observation cough set in, with copious muco-purulent expectoration. Four days later the physical signs of pneumonia were detected. The disease pursued rather a protracted course, but ultimately terminated in recovery.

Wohlfarth, of New York, ¹⁵⁰, has reported a case of insolation in a hostler, engaged in part by day and in part by night, who was found in bed, in the course of a hot afternoon, unconscious, cyanotic, with irresponsive, contracted pupils, injected conjunctivæ, and dry, hot skin; the vessels of the neck pulsated strongly; the breathing was slow, irregular, labored, and stertorous; the action of the heart was labored, regular, and 116 in the minute; the radial pulse was relatively weak; the axillary temperature was 110° F. (43.3° C.). By means of ice and such material as could be obtained, cold applications were made, and the temperature came down to 108° F. (42.2° C.). The man died while on the way to the hospital.

ARDENT FEVER.

Miller, of Portsmouth, ²_{Dec. 10, '91} reports a case of ardent fever in which recovery followed the subcutaneous administration of apomorphine. The case was that of an artilleryman, 31 years old, who had served in the West Indies and had suffered from enteric fever, bronchitis, and ague. He reached England in a semi-conscious state, with flushed face, congested eyes, partially-dilated pupils, and hot and dry skin. The temperature was 106° F. (41.11° C.). Twenty grains (1.30 grammes) of quinine were given and the man was put into a wet-pack, but his condition remained practically unchanged. Later, $\frac{1}{10}$ grain (0.006 gramme) of apomorphine was injected beneath the skin of the arm. Soon afterward, 2 ounces (60 grammes) of yellowish, undigested food were vomited and the temperature declined. Thereafter the patient continued to improve, and he had soon entirely recovered.

MISCELLANEOUS FEVERS.

Milnes ⁶_{June 11} expresses the opinion that the same affection is described in different places by the names Malta fever, Rock fever, Cretan fever, and with which the local fever of the Red Sea ports is identical. While in a series of cases some will present the characteristics of enteric fever, and others, perhaps, those of malaria, a large number present features of neither. An attack may be of varying duration, and of sthenic or asthenic type. The invasion is marked by loss of appetite, often by headache or backache, but seldom by rigor or vomiting. The rise of temperature, sudden or gradual, reaches its maximum early,—generally within the first three days. There may be some slight pulmonary or pleural congestion. In rare cases slight jaundice occurs. At a late stage rheumatism is not an uncommon complication. The tongue is covered throughout the attack by a dense white fur, the disappearance of which may be considered an indication of recovery. The bowels are almost always constipated; intestinal symptoms resembling those of enteric fever are wanting. Enlargement of the spleen is rarely to be detected. If recovery do not occur within a week or ten days, progressive debility and emaciation appear, together with irregularity of temperature without rigors,—a condition that may continue for weeks or months, and for the relief of which change of climate seems essential. In the line of

treatment, patients were kept in their hammocks, and given only a liquid diet until the tongue became clean. A dose of calomel was given at the outset, and a saline mixture containing potassium nitrate, sodium bicarbonate, with or without magnesium sulphate, according to the condition of the bowels, thrice daily. In a considerable number of cases quinine was given in large doses,—from 25 to 40 grains (1.62 to 2.59 grammes).

In connection with the foregoing, Oliver, of Newcastle-on-Tyne, ⁶_{Am. J.} records having observed six or seven cases of a febrile disorder in sailors who had recently come from the river Danube, and to which he gives the name of Danubian fever. Among the symptoms present were vomiting, at times of blood; diarrhœa, the stools at times containing blood; albuminuria; hæmaturia; chills, fever, and sweats; enlargement of the spleen; sponginess and bleeding of the gums; delirium; vertigo. In treatment, quinine, followed by arsenic, proved useful.

Bond, of Bradford, ⁶_{Am. J.} relates that of a crew of 25, aboard a vessel that had just returned to England from a cruise on the Danube, 13 presented symptoms of what is called Danube fever, and 1 died. The principal points noted at the post-mortem examination were extreme congestion of internal organs, splenic enlargement, meningitis, and endocarditis. The illness was attributed to drinking Danube water.

Atypical Fevers.—Cain, of Nashville, ⁸⁶_{Am. J.} expresses the opinion that there exists in the Southern United States a distinct type of specific fever, bearing no relation to enteric fever, and no similarity beyond the continuous character of the fever; and no relation to malarial fever, which he believes to be dependent upon a septic agency, elaborated in the ground-soil and conveyed into the human system by foods, drinks, and through the inspired atmosphere.

Cyprus Fever.—Carageorgiades, corresponding editor in Cyprus, Greece, expresses the view that Cyprus fever, or febris complicata, is a distinct affection; not typhoid, not malarial, not relapsing fever, but presenting some analogies with Malta and Mediterranean fevers. The disease is characterized by neuralgic or rheumatoid pains, constipation, night-sweats, often enlargement of the spleen and of the liver; rarely, congestion of the peritoneum, of the duodenum, or of the jejunum. The duration is protracted; the course of the disease marked by recurrences. Recovery is the

usual termination. Nothing is accurately known of the etiology. The disease has been observed at the sea-board under conditions favorable to the development of organic fermentation. It is most prevalent in the summer; it is endemic, and is most common in persons between 20 and 35. There is no evidence of its contagiousness. An attack confers immunity. The pathologic changes are not distinctive. The presence of micro-organisms in the blood has been described. The period of incubation is from six to ten days. The invasion is insidious; fever, at first intermittent, then remittent, finally continued, is present. Malaise, headache, sleeplessness, loss of appetite, thirst, nausea, sometimes vomiting, are also present; the tongue is not heavily coated; the bowels are constipated. Various distributed pains are felt. The symptoms continue for from one to four weeks. Convalescence seems about to set in, but rigors, headache, diarrhoea, and febrile symptoms appear, and may continue for five or six weeks more. Prostration is decided, and night-sweats may occur. There may likewise be bleeding from the nose. Convalescence now sets in. Rarely, another relapse takes place. The disease is more especially to be differentiated from enteric fever and relapsing fever. The treatment is largely symptomatic.

Typho-Malarial Fever.—While not maintaining that typho-malarial fever exists as a distinct affection, Comegys, of Cincinnati,¹⁸⁹ expresses the view that the type of disease known by that designation presents features that differ from those of typical enteric fever. In typho-malarial fever the febrile movement is of remittent type; cerebral symptoms are not prominent; the appetite is preserved; thirst is present; the tongue is flabby and covered with a white coat; constipation is the rule; the patient is anxious as to the outcome of his illness; tympanites is not marked; abdominal tenderness is slight; pulmonary complications are uncommon; adynamia is not marked; neuralgic pains are often present. Examination of the blood fails to disclose the presence of plasmodia. In treatment, a preference for antipyretics is expressed. For intestinal hæmorrhage, castor-oil is recommended; a tablespoonful every hour until it appears in the stools. For severe epistaxis, injections of water, as hot as can be borne, into and through the nostrils are practiced. Tympanites is controlled by a cold pack over the abdomen. If meningitis threatens or

develops, repeated douches of cold water upon the head for ten or fifteen minutes at a time are employed and 10 or 15 grains (0.65 to 0.97 gramme) of potassium iodide are given every four hours. A feeble recommendation of the cold bath is made.

Weil's Disease.—Sievers⁴⁹⁸_{Dec. 78} ⁵⁰⁶_{Mar. 25} relates that as early as 1878, Runeberg, of Helsingfors, described, under the designation of febris remittens cum ictero, the complex of symptoms described eight years later by Weil and, after him, called Weil's disease. In thirteen years 14 cases had come under observation; most of them were in persons between 20 and 30 years old; 7 were in males and 7 in females; cases were more numerous between the months of September and December. In none of the cases was the etiology clear. The affection is considered a distinct one, probably of infectious origin.

Yellow Fever.—Guimera⁷⁷³_{Nov. 20} has employed the so-called cold chamber of Garcia in the treatment of two cases of yellow fever, and arrives at the conclusion that the method possesses no special advantages, while the apparatus required is rather expensive. The patient, well covered, except his head, is kept for twenty-four, thirty-six, or even seventy-two hours in a chamber, of which the air is kept at a temperature of from 10° to —2° C. (50° to 28.4° F.) by means of ice. Food is withheld and a minimum amount of medicine is given.

DIPHTHERIA, CROUP, PERTUSSIS, AND PAROTITIS.

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DIPHTHERIA.

No disease in modern times has attracted more attention, and been more thoroughly investigated, than diphtheria. Its causation, nature, and treatment are repeatedly discussed in the medical journals and societies of all countries. Nevertheless, it has continued to extend, and has encircled the globe, causing a large mortality in the cities and medical centres, as well as in rural localities. We read of its occurrence, with the usual death-rate, in distant Brazil, Algeria, and Australia, as well as in places nearer home.

The experimental and clinical study of diphtheria, during the last year, has elucidated the fact, previously vague and uncertain, that the pseudomembranous inflammations of microbic origin, to which the term diphtheria has been applied from the time of Bretonneau, really consist of two diseases, now designated by the terms true diphtheria and pseudodiphtheria, or diphtheroid, the former caused by the Klebs-Loeffler bacillus, and the latter by the streptococcus, and occasionally by other cocci.

It is well known that the Klebs-Loeffler bacillus has not only remarkable vitality, but remarkable power of propagation. Numerous instances have occurred in which objects infected months, or even years, previously, have communicated diphtheria. Moreover, filthy accumulations of all kinds afford a nidus, in which the diphtheritic bacillus is rapidly developed, and currents of air or gases, ascending from these beds of infection, convey it and propagate diphtheria. In a city like New York, in which diphtheria is established, or endemic, its sewers, extending many miles, are

infected by the bacillus; and sewer-gas, escaping into apartments and inhaled by children, causes diphtheria in numberless instances.

Wherever diphtheria is epidemic or endemic, mild as well as severe cases occur,—so mild, in many instances, that the affected children do not complain, or complain but little, so that they are allowed to leave their homes and mingle with other children. These walking cases, that visit places where children congregate,—as the schools and dispensaries,—and call upon their playmates in unsuspecting families, are largely instrumental in disseminating diphtheria. Therefore, the action of Health Boards, compelling the non-attendance at school of children living in domiciles where diphtheria is prevailing, is not only fully justified, but more stringent precautionary measures are required.

Although the Klebs-Loeffler bacillus is the recognized cause of true diphtheria, certain accessory germs, mainly cocci, occur during the course of the attack, in the pseudomembrane, upon and in the inflamed surface, and also in internal organs, if the disease be severe, having obtained a nidus favorable for their development in and upon the diseased parts. It appears, from examinations made, that these accessory germs are, in some cases, taken up by the lymphatics and blood-vessels, and conveyed to the lymph-nodes and the connective tissue of the neck, causing inflammatory tumefaction, and to internal organs which are not reached by the Klebs-Loeffler bacillus. These accessory germs probably increase the severity of true diphtheria. Their presence as a complication is an interesting fact, inasmuch, as we shall presently see, that the streptococcus and, in less degree, other forms of cocci are the cause of pseudodiphtheria.

Pseudomembranous Inflammation, designated Pseudodiphtheria or Diphtheroid, Caused by the Streptococcus and, to a Less Extent, by Other Forms of Cocci.—In a paper recently read, before the Berlin Medical Society, by Baginsky, and discussed by Virchow, Hensch, Guttman, Fraenkel, Ritter, and others,⁴ Baginsky stated that he had made tube-cultures from the false membranes of all the cases of sick children admitted into the hospital, during the past year, with the diagnosis of diphtheria. He obtained cultures of the Klebs-Loeffler bacillus in 118 out of 154 cases. In most of these cultures the microbes associated with the bacillus disappeared during the cultivation, while the bacillus multiplied, was typical,

and was easily recognized. In the remaining 36 cases, cultivation yielded no bacillus, but only cocci; and 32 of these recovered in a few days, without any complication. Of the 4 who died, 2 had empyema, 1 pneumonia complicating measles, and the remaining 1 had severe paralysis at the time of admission.

From these observations, Baginsky is led to believe (and those who discussed his paper, with, perhaps, one exception, seemed to agree with him in the matter) that there are two forms of pseudomembranous inflammation of microbic origin, the one produced by the Klebs-Loeffler bacillus being more severe and fatal than the other. The milder disease, Baginsky believes, is caused by cocci (the streptococcus and staphylococcus). Baginsky has also, like other observers, noticed that, while paralysis is common after the diphtheria caused by the Klebs-Loeffler bacillus, it is not liable to occur as a complication or sequel of the inflammation caused by cocci. Both the pseudomembranous inflammations—that produced by the Klebs-Loeffler bacillus and that produced by the cocci (streptococcus and staphylococcus)—are, says Baginsky, accompanied by fever, tumefaction of the lymphatic glands, and prostration.

T. M. Prudden, of New York,⁵ has published the results of carefully conducted microscopic examinations in twenty-four cases of supposed diphtheria. In nearly all the cases the material was obtained from those who had recently had scarlet fever or measles, or had been in wards in which these diseases had recently occurred. In none of the specimens was the Klebs-Loeffler bacillus discovered, but the streptococcus occurred in abundance. At a recent meeting of the Irish Royal Academy of Medicine, McWeeney,² also related a case of pseudodiphtheria occurring after scarlet fever. The microscopic examination disclosed the presence of cocci, but not of the Klebs-Loeffler bacillus.

Martin²⁰² has published an interesting paper, detailing the result of the examination of 200 cases, which had been diagnosed diphtheritic. In 72 of these cases, 29 of which were croupous, the Klebs-Loeffler bacillus was absent. Exposure to scarlet fever or measles had occurred in some of these cases. Martin noticed the fact that the mortality was greater in cases produced by the Klebs-Loeffler bacillus than in those in which this microbe was absent. Koplik¹ made microscopic examinations in

30 cases of pseudomembranous inflammation, and in 17 "no Loeffler bacilli were present."

Wm. H. Park, of New York, ⁵⁹_{July 25, Aug. 6} has published the results of cultures and microscopic examinations in a large number of cases of "Diphtheria and Allied Pseudomembranous Inflammations." He states that, in 127 cases of true diphtheria, 34½ per cent. died; in 114 cases of pseudodiphtheria, uncomplicated with infectious diseases, only 4½ per cent. died; but in 20 that were complicated, 30 per cent. died. Park describes the various forms of pseudomembranous inflammation in true diphtheria, in his last paper, and writes as follows in reference to pseudodiphtheria: "The inflammations caused by the streptococci, and, to a less extent, by other cocci, also differ greatly. They may be conveniently divided into: 1. Pseudomembranous angina. In the typical cases a thin, friable, greenish pseudomembrane covers the margins of the uvula, faucial pillars, and sides of pharynx, the tonsils frequently having thicker exudates. In the less-marked cases, only the uvula or faucial pillars, with or without the tonsils, are affected. In these the local and constitutional symptoms differ greatly; when uncomplicated with infectious diseases, they seem to regularly recover unless the larynx is involved. 2. Pseudomembranous laryngitis. In these cases the larynx and bronchi are chiefly affected. Broncho-pneumonia is a frequent complication. They may die from suffocation, or from the complicating bronchitis and broncho-pneumonia. 3. Croupous tonsillitis. In these the tonsils are more or less completely covered by patches of exudate or pseudomembrane. The local and constitutional symptoms are frequently marked in the first few days. They regularly recover. 4. Follicular tonsillitis. 5. Acute pharyngitis and tonsillitis without exudate. 6. Cases similar to all the foregoing, but complicating infectious diseases. In these there is a considerable mortality."

Cultivation.—Fibiger ⁵⁷³_{p.206}; ⁵⁷³_{Sept. 1} cultivated the diphtheritic bacillus by Roux and Yersin's method. He found it easy in forty cases, and recommends the culture as a reliable means of diagnosis, which can be made in twenty-four hours. [The cultivation and isolation of the Klebs-Loeffler bacillus are now made in many laboratories, aiding greatly in the diagnosis of obscure cases.—J. L. S.]

Anatomical Changes Caused by the Toxalbumen, or Poison Secreted by the Klebs-Loeffler Bacillus.—Welch and Flexner ⁷⁸⁴_{Aug.} ob-

tained this poison, separated from microbes and purified by filtration through a Chamberland filter. With it they inoculated a guinea-pig on December 10, and again on December 14, 1891. The animal died on January 5, 1892. The following were the anatomical changes or lesions produced by the inoculations: Subcutaneous tissues injected; hæmorrhage in axillary and inguinal regions; axillary, cervical, and inguinal glands swollen and congested; thyroid congested; excess of clear peritoneal fluid; both peritoneal layers injected; spleen double the average size, mottled, and its white follicles distinct; liver dark and hyperæmic, very fatty, and containing lighter areas, due to dead liver-cells; kidneys congested; cut surface cloudy; epithelium extremely granular and swollen, but not fatty. Attempts to make cultures from the blood and organs failed, the culture media remaining sterile; the lymph nodes and sinuses showed fragmentation of nuclei, as did the nuclei of the splenic cells, and some of the cells were destroyed. A microscopic examination of the white areas of the liver showed necrosed cells, for the most part free from nuclei and hyalin; leucocytes had wandered into the area of dead cells. These experiments afford additional proof that the blood-poisoning in diphtheria, and the many anatomical changes occurring in the disease, are produced by the poisonous principle generated by the bacillus, and not by the direct action of the bacillus.

F. de Grandmaison²¹ says that, although the Klebs-Loeffler bacillus, the known cause of diphtheria, occurs only in the pseudomembrane, and upon the inflamed surface that produces the pseudomembrane, the poison generated by the bacillus causes paralysis, ganglionic engorgement, albuminuria, patches of sphacelus, and visceral lesions, which, although they may be latent during life, are discovered by microscopic examination of the diseased viscera in the cadaver. Although these anatomical alterations are, for the most part, due to the poison generated by the Klebs-Loeffler bacillus, certain of them are, probably, due in part to the noxious action of other microbes, which add their baneful influence to that of the specific bacillus.

The following instance, among others, showing a common mode in which diphtheria originates in the cities, is related by H. Mallins.⁶ A boy of 10 years had diphtheritic pseudomembranous angina, followed by almost universal paralysis. The room

in which he slept was found to contain an offensive odor, which was traced to an untrapped and broken pipe, communicating with a cess-pool. There was no diphtheria in the neighborhood, and no other case occurred in the family. It seemed certain that the diphtheritic bacillus had been communicated from the foul drain, but how it entered the drain is uncertain.

Observations are accumulating which show that diphtheria occurs in certain animals, and is sometimes communicated from them to man. This has been proven by inoculations, in many laboratories, made for experimental purposes. The feathered tribe, especially, appear to be liable to this disease. Diphtheria in families has also, in a considerable number of instances, been traced to that pet of the nursery, the cat.

Milk, the common food of the nursery, and the vehicle of various noxious microbes, is sometimes the medium of communication, as it is known to be of scarlet fever. I am not aware that any cases showing this mode of communication have been reported during the past year, though the literature of diphtheria, in previous years, contain sufficient instances to establish the fact.

Prognosis.—Louis Martin²⁶²₂₆₄ has published a treatise based on the study of two hundred cases of diphtheria. He states that the diphtheritic bacillus does not always present the same form. He distinguishes three varieties,—a long, a short, and an intermediate form. He expresses the opinion, which has not been observed by American bacteriologists, that the severity of the attack varies according to the form of the bacillus; that it is benign when the bacillus is short, virulent when it is long, and intermediate in intermediate forms. As regards prognosis, the information furnished by clinical facts, and especially the temperature, is important for guidance. If, says Martin, the temperature be elevated from four to six days, and then undergoes descending oscillations; or if descending oscillations occur immediately, the prognosis is usually good. If the temperature be elevated, being between 39° and 40° C. (102½° and 104° F.), the prognosis is grave; but the issue need not necessarily prove fatal. If it be more than three days without descending oscillations, the prognosis is more grave; if the temperature of about 40° C. (104° F.) increase, the prognosis is almost always fatal. If the temperature, having attained and exceeded 39° C. (102½° F.), descend gradually, the prognosis is

good; but an abrupt fall of temperature is not ordinarily a favorable prognostic sign. When diphtheritic inflammation invades the larynx, and also when it invades the bronchi and lungs, the temperature rises, and the prognosis is grave.

Martin has collected 69 observations, in which diphtheritic angina occurred without laryngeal disease. In 52 of these he found the Klebs-Loeffler bacillus, not associated with other organisms. In the remaining 17 cases these bacilli were associated with other microbes. Of the 52 cases, 24 lived and 28 died. In diphtheritic angina which ends favorably the child's general condition is good, its color natural, the false membranes white, or slightly gray. They are not continuous, and in the intervals between them the mucous membrane is healthy, or slightly inflamed. The angina frequently simulates a folliculitis, two or three white points appearing to emerge from the follicles of the tonsils; a unilateral inflammation is not rare in these favorable cases; the lymphatic nodes are but slightly inflamed, and the urine contains little or no albumen.

Statistics.—Hoppe-Seyler⁵²⁶_{v. 49, No. 5} gives the following statistics: Number of cases, 445; infected by previous cases in the house, 149; infected at school, 11; mode of infection unknown, 110; age in first year, 6; age in second year, 22; during third year and subsequently, mortality increased. Initial symptoms: Dysphagia; less frequently, hoarseness; sometimes no definite ailment, but simply unwell. Seat of exudation: Upon tonsils, 93 per cent.; palate, 43 per cent.; pharynx, 32 per cent.; nose, 16 per cent.; larynx, 99 per cent. Complications: Submaxillary glands swollen, 75 per cent. (these glands were much swollen in gangrenous diphtheria, and in 6 cases cervical abscesses occurred); purulent bronchitis common, and sometimes broncho-pneumonia; pleura seldom affected; heart disease, usually cloudy swelling, present in 88 per cent. of the fatal cases, whatever the cause of death; in some cases, fatty degeneration had occurred, with paleness of the myocardium.

Fifty-one per cent. of all the cases had marked weakness of the heart, and, of these, 76 per cent. died. In those which recovered there was long-continued pain and palpitation in the region of the heart. The cardiac weakness began in from two to twenty days. Bleeding from the nose was frequent, also from the pharynx; and

in 3 cases there were hæmorrhages under the skin. The kidneys were diseased in 52 per cent. of all the cases (17 per cent. of the adults and 61 per cent. of the children), determined by the presence of albumen. Paralysis occurred in 15 per cent. of the cases, most frequently of the palate and pharynx.

Tracheotomy was performed 213 times, in cases of diphtheria complicated by croup; in 178 operated on, having simple diphtheria, 124 died; in 35 operated on, having gangrenous diphtheria, all died.

Complications and Sequelæ.—Arnheim¹⁵⁸_{1811, H. 44, 6} examined the nerves and muscles in eight post-mortem examinations of children who had had diphtheritic paralysis, and found (1) hyperæmia and capillary hæmorrhages in the nerves of the medulla oblongata, (2) inflammatory processes in the muscles, and (3) parenchymatous and interstitial degeneration of the nervous fibres. These anatomical characters indicate a parenchymatous neuritis with interstitial proliferation.

A. Baginsky, of Berlin,⁷⁶⁰_{July 16} reports his observations of two hundred and forty-four cases of diphtheria. Of these thirty cases were accompanied by paralysis, occurring either during the second or fourth week of the disease, or still later. The cases developing paralysis during the first few weeks of the disease showed generally a paralysis of the soft palate, co-existing at the same time with marked nephritis and cardiac weakness. The paralysis appearing in the later weeks of the disease extended over nearly all muscles, the paralysis of the diaphragm being especially dangerous. We find, then, complete loss of voice; hoarse, aphonic cough, with difficult expectoration; dyspnœa, with thoracic breathing, during which breathing the lower part of the thorax is raised and the abdomen appears sunken. Baginsky describes the cardiac symptoms and draws attention to the acute swelling of the liver which accompanies weakness of the heart-muscle.

F. de Grandmaison writes as follows in reference to diphtheritic paralysis³¹_{Aug. 18}: In the declining period of the disease, even during convalescence, paralysis occurs, commencing in the velum palati, and affecting the muscles of deglutition and speech. The patient breathes with pain, and noisily; his voice has a nasal tone, he may not be able to pronounce the guttural consonants; his deglutition is difficult, and the food may return by the nose, so

that nutrition is insufficient. The paralysis is not always limited to the fauces. It may occur in the muscles of the eye, of the limbs, of the trunk, but we generally observe a paresis or incomplete paralysis in these different regions. The paralysis is much more grave when the heart or respiratory muscles are affected, for death then occurs often from syncope or asphyxia. These paralytic results of diphtheria have been reproduced in animals in the experiments of Roux and Yersin, but they have only discovered minimum lesions in the spinal cord consisting of very slight congestion and softening.

In eight cases of pneumonia occurring in diphtheria, Strelitz¹⁵⁸_{2,13,24,4,6} found the following organisms either isolated or in combination: (1) the diplococcus Fraenkel; (2) the staphylococcus pyogenes aureus et albus; (3) streptococcus pyogenes; (4) Friedländer's bacillus; (5) diphtheria bacillus. A. M'Phedran⁸⁹_{Oct.1} relates the following case: Grace —, aged 12 years, had pharyngeal diphtheria on May 30th. On June 4th, was convalescing, the fauces being free. On June 5th, took nutriment and said she felt well. A few minutes later she breathed deeply, and when the nurse reached her side was unconscious. The coma increased, and in six hours she died. At the autopsy a large white embolus was found at the bifurcation of the basilar artery; its origin was not ascertained. The heart was not examined, but neither it nor the kidneys had shown signs of disease.

Prophylaxis—Amygdalotomy as a Preventive of Diphtheria.—Lancry²²⁰_{p.100} says that hypertrophy of the tonsils, by diminishing the fullness of respiration and compelling the child to breathe through the open mouth, causes narrowness of the chest, diminishes the richness of the blood, hinders physiological development by the anginas which it provokes, and determines constitutional weakness. He states that, on account of the tonsillar hypertrophy, the child receives directly upon the fauces atmospheric dust and the pathogenic germs, of which the dust is the vehicle. The hypertrophy, by inducing the child to breathe through its open mouth, increases the liability to taking cold and the occurrence of angina. Thus, the removal of tonsils so hypertrophied as to embarrass respiration or render it abnormal is a preventive measure as regards diphtheria. Lancry cites clinical observations in support of these opinions. He would not, however, remove enlarged tonsils

immediately after exposure to diphtheria or other infectious disease, but would allow some time to elapse for local antiseptic treatment and the destruction of germs.

Lavrand's views²²⁰ are not entirely in accord with those of Lancry. He believes that respiration through the open mouth, and consequent thoracic deformity, are not only due to hypertrophied tonsils, but more frequently to naso-pharyngeal adenoid growths, since, if we do not treat the tonsils, though considerably enlarged, but remove the adenoid growths, the respiration becomes nasal, and the thoracic deformity diminishes, if the patient be sufficiently young. Nevertheless, enlarged tonsils predispose to anginas, and serve frequently as the *porte d'entrée* of pathogenic micro-organisms. For this reason their removal is very useful.

Treatment.—Baginsky¹⁵⁸ has prescribed many remedies, and believes that no one of them can be considered a specific. He has employed injections of the extract of the Klebs-Loeffler bacillus, a mode of treatment analogous to Koch's employment of tuberculin in phthisis, but without effect. The mortality from diphtheria in his hospital has been 40 per cent., but, when those cases which were so far advanced at the time of admission as to be incurable were subtracted, 25 per cent.

F. Bloebaum⁴¹ employs the galvano-cautery, but only when the disease is confined to the tonsils, the soft palate, the uvula, and the posterior pharyngeal wall. The false membrane is thus burnt off, and does not form again. The temperature is normal after twenty-four hours. This treatment should be employed in the beginning, before systemic infection has occurred, when the malignant diphtheritic swelling can be uniformly transformed into a benign burn. The exact mode of applying the galvano-cautery is not stated. According to the author, red-hot iron is a concentrated antiseptic, whose action is strictly limited to the diseased parts; it destroys the microbe and the focus of infection, and excites a regenerative process. Goris²⁸⁸ used the galvano-cautery in three cases of mild diphtheria. After the cauterizations the temperature fell and the scars were detached in five days. The malady did not extend, and cure was accomplished.

O. Larcher⁵² recommends the application, every two hours, of crude petroleum, by means of a brush or gargle, in the treatment of faucial diphtheria. In some instances, he employs, in ad-

dition, the spray of carbolized water. Of forty-two cases thus treated, forty recovered. Larcher summarizes his opinions as follows: 1. Crude petroleum employed alone by gargle or brush may suffice to cure diphtheritic angina. 2. Its employment is exempt from any inconvenience that might cause hesitation in having recourse to it. 3. Other agents may be used with it, as salicylic acid and carbolized vapors. 4. The duration of treatment varies between eight and eighteen days. In none of the cases treated in this manner did diphtheritic complications occur in the larynx, nor other disorders, except rarely paralysis of the palate, and in one case transient loss of sight. By the use of the petroleum the amount of pseudomembrane progressively diminishes.

Joseph Drzewiecki, of Warsaw, Poland, corresponding editor, reports the following successful mode of treating diphtheria. A. Ozegowski⁷⁸⁸ has had no fatal case of diphtheria in ten years, curing patients in the following manner: He brushes, every two to three hours, the places covered with whitish spots, with a camel's hair pencil or swab dipped in the following solution:—

R Acidi carbolici,
Acidi citrici,
Tinct. iodi, ʒss 8-5 grammes (gr. xlv-lxxv).
Spiriti vini gallici, 100 grammes (ʒiii½).—M.

For the older children, he prescribes, in addition to the above, gargling with a solution of chlorate of potassium or sodium. He prohibits the use of milk and gives lemon-juice as a drink.

A. Josias⁸¹ claims good results from the application to the fauces of a mixture composed of 20 grammes (5 drachms) of phenic acid, and 80 grammes (2½ ounces) of sulphuricinate of sodium. The application is made by a tampon immersed in a 20-per-cent. solution, and applied five or six times in twenty-four hours. Twenty-four of thirty-two cases treated by this method in the Hôpital des Enfants recovered. Florin²⁹⁰ agrees with Dujardin-Beaumetz in regard to the value of chloride of zinc in diphtheria. He states that this caustic, notwithstanding its energy, acts only on surfaces deprived of epithelium. Florin employs the following prescription:—

R Chloride of zinc, 15 grammes (4 drachms).
Yellow cinchona-bark, in powder, 15 grammes (4 drachms).
Honey, sufficient to make a thick paste.—M.

This is applied, by means of a pledget of cotton on a holder, every two to four hours.

Wilhelmy⁸⁹ applies, by means of cotton-wool, grasped by forceps curved at the end, a 20-per-cent. solution of chloride of zinc, once only and as thoroughly as possible. He says that this caustic penetrates as deeply as possible into the diseased tissues, but spares the sound epithelium. Extension of the pseudomembrane to the nose or larynx did not take place. The slough separated in from three to six days, and threatened cardiac failure never occurred. More than one hundred cases were treated by this method. [I may state that, in America, treatment by caustic applications, or applications that produce hæmorrhage or sloughing, have been, for the most part, discarded, in the belief that they are more likely to do harm than good. Mild, but penetrating and efficient, antiseptics are used instead.—J. L. S.]

Vianna²¹³ states that, from observations made in the laboratory of Strauss, he discovered that antipyrin exerted a destructive action on the Loeffler bacillus, and on its toxic properties. A 2½-per-cent. solution of antipyrin prevents the growth of the bacillus, and, if added to the culture tubes, it kills the fully-developed bacillus in twenty-four hours.

Jules Simon's¹⁷⁵ principal treatment consists in applications to the fauces, with a pledget of cotton wound around the points of the long forceps. Two forceps are thus prepared; with the one he carefully, but without injury, cleans the fauces; with the other, soaked in the following solution, he bathes the entire surface of the fauces, being careful not to injure the mucous membrane:—

℞ Salicylic acid,	0.60 gramme (9 grains).
Infusion of eucalyptus,	60.00 grammes (15 drachms).
Glycerin,	40.00 grammes (10 drachms).
Alcohol,	15.00 grammes (3½ drachms).

Then the cotton, detached from the forceps, is thrown into fire, and the forceps are placed in boiling water. These applications are made every two hours. Simon advises not to employ carbolic acid for patients under the age of 2 years, for he has often seen poisonous effects from small doses. In the interval he prescribes, for irrigation of the fauces, lime-water, a 4-per-cent. solution of boracic acid, or a 2-per-cent. solution of borax, used warm.

For the purpose of disinfecting the air respired by the patient, Simon does not employ the vapor of carbolic acid, but that of an infusion of the walnut, of thymol, or of simple alcohol. He also recommends changing the room during the day, in order to obtain purer air, inhalations of oxygen-gas every two hours, ventilation indirectly through a doorway and not from a window, and maintaining the temperature of the apartment at 15°-16° C. (59°-61° F.). Simon prescribes, for internal treatment, the tincture of the chloride of iron, 3 to 6 drops, in water, every three hours. He avoids, as incompatible, its mixture with milk or gum-water, and its administration from a metallic spoon. If the patient is older than 5 or 6 years, he prescribes the oleoresinous extract of cubebs in a dose of 4 to 6 grammes (1 to 1½ drachms) in an aromatic potion, or a bolus of cubebs, copaiba, iron and bismuth. If the pseudomembranes have considerable thickness, he applies lightly, with a pledget of cotton, a mixture of equal parts of glycerin and the perchloride of iron, twice daily. If the nasal fossæ are involved, he irrigates the nostrils frequently with a 4-per-cent. solution of boracic acid, and applies a sulphur ointment.

Ernst Gaucher employs the following formula for application to the fauces:—

R Camphoræ,	. . . . .	20 grammes (ʒv).
Olei olivæ,	. . . . .	15 grammes (ʒiv).
Alcoholis,	. . . . .	10 grammes (ʒiiss).
Acidi carbolici (cryst.),	. . . . .	5 grammes (gr. lxxv).
Acidi tartarici,	. . . . .	1 gramme (gr. xv).—M.

This application is made twice daily, with strong pressure, so that it will, if possible, permeate and destroy the pseudomembrane. The application is painful, so that Gaucher says cocaine may be employed to relieve the pain, but adds, "this substance should be used with great care in children, since adults have been nearly poisoned by its use. Between the applications of the carbolic acid and camphor, Gaucher recommends irrigation, every two hours, with a 1-per-cent. solution of carbolic acid.

Stein¹¹⁸ recommends Josef Burghardt's mode of treatment, which is as follows: a gargle of lime-water and distilled water, equal parts; then the most nutritious food; then another gargle; then covering the diseased portions of the throat with a mixture of equal parts of sulphur and quinine, applied by Burghardt's

blower; then no food or drink for an hour and a half. In rhinitis the powder is blown into the nostrils, Titta's advice being observed not to cease pressure upon the bulb until the instrument is withdrawn from the mouth or nose. According to the statistics of Stein's cases and those of Burghardt and Titta, this treatment apparently shortened the disease and aided in throwing off the necrosed portions.

[In America, certain new remedies or those formerly seldom prescribed have come into more extended use during the past year. The conviction is strong and increasing in this country, that while the most powerful and penetrating antiseptics should be early and frequently applied to the pseudomembrane and inflamed surface, those should *not* be prescribed that are caustic and irritating, that cause smarting, an increase of the hyperæmia, or that wound the lymphatics or blood-vessels of the area, and thereby open the channels of absorption. Among the remedies alluded to, trypsin and sulphur have given satisfaction in that large institution, the New York Foundling Asylum, and in family practice, employed in the following manner: Trypsin, when well-prepared and fresh, is an active solvent of pseudomembranes, but it requires an alkaline medium for its activity. Sulphur, as shown by E. R. Squibb, of Brooklyn, and others, requires moisture in order to obtain its full activity and efficiency as an antiseptic agent. Therefore, by means of a steam-atomizer, the vapor of the following prescription is constantly directed toward the face of the patient:—

R Sodii bicarbonat., ℥ij (8 grammes).
 Aquæ calcis., Oij (1 litre).—M.

Or this:—

R Ol. eucalypti, ℥ij (8 grammes).
 Sodii benzoat., ℥j (4 grammes).
 Sodii bicarbonat., ℥ij (8 grammes).
 Glycerini, ℥j (80 grammes).
 Aquæ calcis, Oij (1 litre).—M.

While this spray is being used, the following powder is blown, by the insufflator, over the fauces and into the nostrils every hour to two hours:—

R Trypsin,
 Sodii bicarbonat., ʒss (16 grammes).
 Pulv. sulphuris, ℥ij (8 grammes).—M.

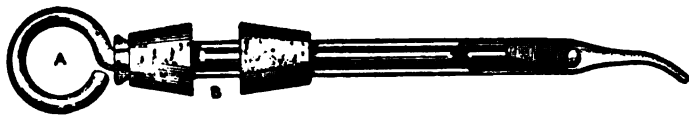
Another remedy, coming into extensive use in America, is the peroxide of hydrogen. As this agent is highly recommended by many physicians in the States, and condemned by others of a national or world-wide reputation, it is necessary that I should treat of it at considerable length.—J. L. S.]

Peroxide of Hydrogen.—(Symbol, H_2O_2 ; specific gravity, 1.453; synonyms, dioxide of hydrogen, binoxide of hydrogen, deutoxide of hydrogen, oxygenated water; French, hydrogène dioxide, eau oxygéné; German, wasserstoffsperoxyd.) During the last two or three years this agent has been largely used, especially in America, in the treatment of the microbic and infectious diseases. It is a powerful germicide and antiseptic, devoid of odor and of toxic properties. Used in the treatment of diseases, it is readily decomposed into water and four hundred and seventy-five times its bulk or volume of free or nascent oxygen-gas, and its germicide and antiseptic properties are due to this element. The peroxide, in its concentrated form, is highly irritating, producing a caustic effect when applied to the tissues. It is, therefore, when prepared in the laboratories for medicinal purposes, commonly so diluted that it yields fifteen times its volume of nascent oxygen. This is designated the "fifteen-volume solution." A twenty-volume and stronger solutions have also been prepared.

George E. Fell,⁶⁴⁷_{Sept.} in a paper read at the Forty-third Annual Meeting of the American Medical Association in Detroit, June, 1892, says, in reference to the treatment of the opening in the trachea in a case of tracheotomy: "Regarding the peroxide of hydrogen, its value was unquestioned. It produced liquefaction of the membranes in the throat; but, whether a weaker solution would have proved more satisfactory or not, I am not prepared to state. As mentioned, the solution was about 33 per cent., and this, apparently, produced no uncomfortable effect when sprayed directly into the tracheal wound. F. H. Williams,⁹⁹_{Sept. 29} says: "The strength of the peroxide-of-hydrogen solution is not estimated in the same way in all countries. In America a 15-volume solution is one that, when mixed with permanganate of potassium, will evolve fifteen times its own volume of oxygen. One-half of this oxygen comes from the peroxide and the other half from the permanganate. In some other countries, in estimating the strength

of the solution, the amount of oxygen evolved from the peroxide only is considered." Williams recommends, for use in diphtheria, a much stronger solution than that commonly employed by American physicians. He says: "I found that, in the laboratory, all the bacilli were killed after ten seconds' contact with a 50-volume (8-per-cent.) acid solution of peroxide of hydrogen, and that this solution did no harm to the tissues, and, as a rule, caused little inconvenience to the patient. Solutions containing 100 volumes (16 per cent.) caused smarting, which continued from one to two minutes; but even stronger solutions could be employed without injury to the tissues.

"To cleanse the throat merely, and as a gargle, a solution of about 15 volumes (2.4 per cent.) will answer; but, where the membrane is thick and tough, it is necessary to use a solution of from 50 to 200 volumes (8 to 32 per cent.), in order to have it efficient. As soon as the peroxide touches the dead tissue, it begins to decompose into oxygen and water." The strong solutions, Williams adds, should always be employed by the physician. He has constructed the instrument for applying the peroxide (represented below), but states that no fixed rules can be given in



SYRINGE FOR PEROXIDE OF HYDROGEN IN DIPHTHERIA.
(*Boston Medical and Surgical Journal.*)

regard to the frequency of its application. "The problem is to treat early, to disintegrate and clear off the membrane by means of the spray and syringe."

The syringe is one inch longer than the drawing; otherwise, this is the full size. The walls of the syringe beyond the piston are thick, and the tip is smooth, having been rounded in a flame. The packing is asbestos. The cost is about twenty-five cents.

"The syringe is first filled with a strong solution of the peroxide. It is held in one hand, the thumb being placed in the ring (A), while the first and second fingers grasp the body of the syringe at B, between the two corks. The mouth of the patient is opened, the tongue depressed with a spoon or depressor, the point of the syringe pushed through the membrane, and a few drops of the

solution pressed out. Immediately there appears a frothy swelling, and the patient expectorates a white froth. The membrane then, in some cases, looks swollen, white, and thickened, and it is not until about one hour later that the most marked improvement is apparent. This treatment should be employed daily, from one to three times, or more often, for the first day or two, after which the spray alone may suffice."

It will be observed that the peroxide, as employed by Williams, in the strength of 50-, 100-, and even 200-volume solution, is only prescribed for the first day or two, and only a few drops are introduced into the pseudomembrane by means of the syringe. [The observations of Jacobi, and other New York physicians whom I might mention, show that the strong solutions of this agent are highly irritating, and may be very injurious.—J. L. S.] At the meeting of the American Pediatric Society, May 14, 1892, Jacobi⁵¹ related the following case: A man of 28 years had the diphtheritic exudate over the tonsils, palatine arches, and uvula. At first he was treated with a mixture of chlorate of potassium and chloride of iron, and subsequently with a spray and wash of diluted peroxide of hydrogen, without other remedy. When Jacobi saw him, four weeks after the invasion of the disease, he suffered severely from the increase of membranes over the mouth and fauces, without fever. "His throat, mouth and lips, and particularly his alveolar processes posteriorly, were covered with white flakes and shreds, some film-like, some half a line in thickness." The underlying mucous membrane was hyperæmic, sensitive, and without epithelium. The patient was constantly suffering, and unable to take solid food. The peroxide was discontinued, and lime-water employed in its place. The cure was so speedy that the patient regarded it as miraculous.

A boy of 5 years had diphtheria, and was treated "with a 5-per-cent. spray of medicinal peroxide of hydrogen." He had been sick three weeks when seen by Jacobi. He was feverish, restless; deglutition was difficult and painful. The inside of his cheeks was in part raw, and in part covered with whitish-yellow flakes, "quite thick on the alveolar processes and in his throat." Lime-water was substituted for the peroxide. "Improvement took place at once, the irritant having been discontinued." Jacobi, in his paper, briefly relates two other cases, and adds: "Such cases

as I have reported—a few only of those I have seen—speak for themselves. The films seen are coagulated albumen, but the damage is done by destroying the epithelium, giving rise to new exudation, new diphtheritic deposits, and to certainly more danger and discomfort.”

At the meeting at which Jacobi's paper was read, Caillé⁵¹ related the case of a child of six years that had been sick with scarlet fever and diphtheria. Diphtheritic infiltration of the mucous membrane of the fauces and epiglottis had occurred, accompanied by mild stridulous breathing. The ordinary medicinal preparation of peroxide of hydrogen diluted with eight times its quantity of water was employed as a gargle and in the nostrils. Twenty-four hours afterward “the mucous membrane on the lips and buccal cavity, which had not been affected at all, assumed a deep-red color, and thirty-six hours after the first employment of this chemical I noticed that this blood-red mucous membrane was covered with a whitish veil, and then I noticed beginning ulceration and a pseudomembrane over these ulcerated spots. I then discontinued the peroxide, and the patient gradually recovered.” Believing that the peroxide was injurious in this case, he has not since employed it. Koplik has also noticed the beefy-red color, followed by a whitish membranous film, produced by spraying with a 25-per-cent. solution of the peroxide, and Huber stated that he had been able to diagnosticate the fact that the peroxide had been used “by the swelled lips, the eroded skin, and the condition of the mucous membrane, so fully described I, therefore, have regarded it as rather a dangerous remedy to use.”

J. R. Espey⁹ has employed the peroxide in several cases with a good result, prescribing it diluted one-half as a throat-wash, applied with the atomizer. A patient thus treated had nearly recovered, only a slight membrane remaining on one tonsil and presenting a rotten, swollen appearance, as if about to be detached. Unfortunately, at this time, the retail druggist received a new supply of the peroxide, made by a different manufacturer. When this was used in the atomizer, the child, who had previously been quiet and docile under treatment, cried with pain, and Espey was sent for in haste. He found a thin, grayish membrane covering the tonsils, uvula, and posterior pharynx, and around the edge of it and in the mouth the mucous membrane was reddened and angry-looking.

He gargled his own throat with the solution, and experienced a sharp, burning sensation, and "his teeth were set on edge" by the solution. The new membrane lasted about a week; its extension ceased when the throat-wash was omitted. A second similar case occurred when the peroxide, from the same source, was employed. The specimens employed were undoubtedly harmful, increasing the inflammation and pseudomembrane. This result seemed to Espey to be due to the hyperacidity of the peroxide. He concludes his history of these cases as follows: "Now, I am thoroughly convinced, from an experience in several severe epidemics, since its introduction, that the peroxide of hydrogen is one of the most valuable, if not *the* most valuable, local agent we have in diphtheria, and I sincerely hope that an agitation against the sale of an impure article may touch the stony heart of the pharmaceutical chemist, so that we shall neither have to abandon this useful agent nor prescribe it with fear and trembling that we may do the little sufferer from diphtheria more harm than good. I know that it is rather an unstable article, but I also know that some samples are harmless and do their work well, while others may be deadly in their effects on a child suffering from diphtheria."

[The fact that peroxide of hydrogen is probably the most powerful germicide and disinfectant, is not poisonous, is devoid of color, taste, and smell, and is therefore readily employed in the treatment of children, has led to its extensive use in the United States. Like most new remedies, it has had its set-back by the report of unfavorable cases, due to the highly-irritating action of certain specimens improperly prepared. Now that attention is called to this matter, it is probable that the chemists will furnish a more uniform and less irritating peroxide. I have seen no increase of inflammation, and no harm from its use, when it was prescribed so diluted with water that it caused no smarting, or smarting lasting not more than five minutes; and I now uniformly direct that the mother or nurse first employ it upon herself, and add more water to it if it cause undue pain. I have, during the past year, employed the 15-volume peroxide diluted with ten times its bulk of water for spraying the fauces, and twelve or fifteen times its bulk for spraying the nostrils. The nascent oxygen evolved from so weak a mixture is considerable, as is seen by the milk-white discharge from the nostrils following the spraying. The spray should, in my

opinion, be applied to the fauces every half-hour to one hour, and to the nostrils every hour to two hours, during the active period of diphtheria. It is not improbable that the frequent application of so powerful a germicide and antiseptic as nascent oxygen is destructive to the bacillus, and, by forming a new combination with the toxic substance which the bacillus generates, tends to render it less poisonous or benign.

In America, the older remedies, as the tincture of the chloride of iron and corrosive sublimate, are still in common use in combating this wide-spread and fatal disease.—J. L. S.]

Culomet.—The vapor of hydrargyri chloridum mite (calomel) sublimated by the action of heat has been employed with marked success during the last year, in the institutions of New York and Brooklyn and in family practice, in the treatment of diphtheritic croup. It has in many instances obviated the necessity of intubation or tracheotomy. Fifteen to thirty grains (1 to 2 grammes) of calomel are placed on a tin plate, over an alcohol-lamp, in a tent about five feet high, constructed over the crib or bed. The vapor produced is pungent, exciting a strong cough, and the patient inhales it, perhaps, half an hour. On one occasion at least it caused salivation in the nurses in the New York Foundling Asylum, although they breathed the air outside the tent. [It has seemed to me, from observations which I have made, that the powerful, modifying action of the calomel-vapor upon the inflamed surface may render it useful if employed once or twice on the first day, in pharyngeal and nasal diphtheria. Of course, during its use the hydrargyri chloridum corrosivum should not be employed.—J. L. S.]

Pine-Apple Juice.—This has some advocates in America. It is supposed to exert a solvent action. It contains a large percentage of malic acid, and its action may be similar to that of acetic and citric acids, which have also been recommended by experienced observers.

J. L. S.

CROUP.

The term *croup*, ²⁸⁷ ₁₈₀₇₋₁₁ etymologically meaning stridulous breathing, first scientifically used by Home, is now susceptible of different meanings: in France, the definition is “tracheal and laryngeal diphtheria”; in Germany, “membranous deposit on the internal surface of organs”; in England, some consider it as a non-specific inflammatory membranous deposit on the mucous mem-

brane of the larynx and trachea ; others consider it a misnomer applied to a local manifestation of diphtheria. Fränkel ⁶⁹_{June 16} believes that idiopathic croup is etiologically identical with diphtheria of the larynx caused by the Klebs-Loeffler bacillus.

Diagnosis.—The diagnosis between true croup and suffocative laryngitis has been studied by Bagot ⁸⁵_{June} in Finisterre, where the winter season is cold and damp. He concludes as follows: 1. Acute suffocative laryngitis develops suddenly, or in the course of a catarrhal laryngitis ; in twenty cases observed, sixteen occurred in the month of January, the others in December and February, chiefly, and the latest at the beginning of June, under the influences of a sudden change in the temperature. Damp and cold weather play the principal part in the development of this affection ; but it may occur also secondary to measles or influenza. 2. There is absolutely no relation with diphtheria. 3. As a rule, children under four or five years of age only are affected. 4. Contagion is slight, if there be any.

Fränkel ⁶⁹_{June 16} records four cases of membranous laryngitis, in which there was no membrane found in the fauces, before or after death ; pure cultures of the true Klebs-Loeffler bacillus were obtained from the membrane in all of these cases, and the author concludes that idiopathic membranous laryngitis and genuine faucial diphtheria are etiologically identical. Egidi and Concetti, of Rome, ⁷⁶²_{Mar.} have also found the true diphtheritic bacillus in the pseudomembrane in cases of acute membranous laryngitis.

Treatment.—The vaporization of calomel as a therapeutic measure for the relief of croup, simple or diphtheritic, is steadily gaining in favor with medical men in New York and Brooklyn ; it is, indeed, sometimes called the Brooklyn treatment. There is, as yet, but little literature of the subject ; but the remedy is being made use of extensively, and the general opinion is very favorable as to its merits. The method is as follows : A powder consisting of from 15 to 30 grains (1 to 2 grammes) of calomel is placed upon a tin plate, and heat applied until all of the powder has been vaporized ; this should be done under a tent erected over the patient's bed, the curtains of which should be kept closed for ten minutes to a half-hour after each fumigation. Dense white fumes are evolved, which are not, however, irritating to the patient, and the change in the respiratory sound, after the first burning of the

calomel, is sometimes very marked. There have been no cases of salivation reported as yet in patients, but nurses and people who have to be in the room during sublimation of the calomel have, in several instances, been salivated; so due care must be exercised.

Turner⁷⁶⁰_{Mar. 19} advocates the administration of the muriate of ammonia, thereby allaying the inflammation of the laryngeal mucous membrane; together with the use of asafœtida suppositories, to control spasm and give sleep.

In a paper on the subject of croup, before the Paris Academy, Pilière⁵⁹⁸_{Jan.} gives the following method of treatment when the disease is diphtheritic in character: He washes out the pharynx, morning and evening, with a cotton brush dipped in a solution of nitrate of silver, of 1 to 30 strength, detaching as much as possible of the false membrane after each washing. He sprays a solution of corrosive sublimate into the throat, using, in children of about two years, 1-500, and, in those younger, 1-1000; this is done every two hours during the day, and every three hours at night.

The subcutaneous injection of a mixture of spirits of turpentine in vaselin, in the proportion of 1 to 5, is advocated by Bonam.¹³⁶_{Aug. 1} The inhalation of vapor laden with turpentine in croup is an established therapeutic measure, but it is questionable if it can be much used by hypodermatic injection, on account of the unavoidable local irritation. Kellog¹⁹_{July} gives turpentine internally in large doses. He reports thirteen cases of croup treated with drachm (4 grammes) doses of turpentine, with eight recoveries. In only one case was any disagreeable effect of the remedy observed, and that was a strangury of temporary character, after 15 drachms (60 grammes) had been given, in twenty-four hours, to a boy 4 years of age.

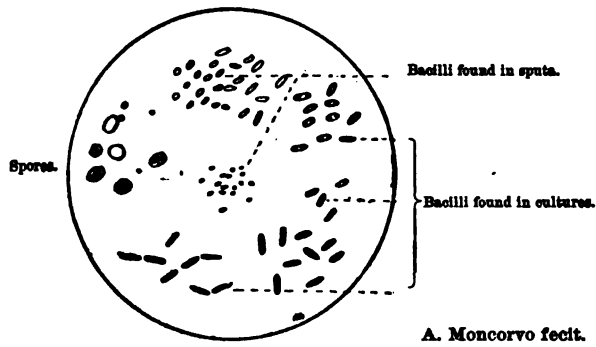
The compound tincture of iodine, in $\frac{1}{2}$ -drop doses every fifteen minutes, has been employed by Watkins¹²_{Jan.} in spasmodic croup, with the effect of promptly arresting the spasm.

The operation of tracheotomy for croup has been done by Bajardi, of Florence,⁷⁶²_{July} from December, 1886, to February, 1892, 115 times; recoveries, 39.93 per cent.; 5 cases died during the operation. In the Hampstead Hospital for Fever Cases, according to Gayton,⁸⁰⁶_{July} previous to September, 1891, the mortality after tracheotomy had been very high; since then, however, there had been a manifest improvement in the results obtained, and the change

has been ascribed by the author to the employment of the bichloride spray to the wound.

PERTUSSIS.

Recent bacteriological researches, made by A. Moncorvo,⁶⁷² prove that the micro-organisms which were discovered in 1883 by Moncorvo, Sr., are true bacilli, which may be cultivated in suitable culture media. Pertussis has been transmitted to animals by inoculating them with pure cultures of these bacilli. The accompanying cut shows the spores, the bacilli found in the sputa, and those obtained from pure cultures. 900 diameters (Zeiss).



(Satellite of the Annual.)

Whooping-cough is an auto-infectious disease, as claimed by Musser,⁴⁸³ and the grave, protracted, and relapsing cases confirm this view. Vladimiroff⁸⁵⁹ gives the following table, which is interesting as showing the ages of 4623 patients, with this disease, brought to the out-department of St. Vladimir's Hospital for Children, in Moscow, between the years 1876 and 1887:—

Under 6 months,	5.5 per cent.
From 6 to 12 months,	11.1 "
From 1 to 2 years,	18.1 "
From 2 to 3 "	14.2 "
From 3 to 4 "	11.6 "
From 4 to 5 "	9.1 "
From 5 to 6 "	7.9 "
From 6 to 7 "	6.1 "
From 7 to 8 "	4.7 "
From 8 to 9 "	4.1 "
From 9 to 10 "	3.8 "
From 10 to 11 "	1.7 "
From 11 to 12 "	1.8 "
12 years and over,	1.8 "

The following points were specially noted: (1) girls are invariably affected by the disease more frequently than boys, of the corresponding age; (2) all the epidemics of pertussis in Moscow occurred during the summer months, recurring at regular intervals of two years (1880, 1882, 1884, 1886); (3) no synchronicity of epidemic whooping-cough with measles was ever noticed. On the contrary, the diseases seemingly show a tendency to alternation.

Treatment.—In view of the theory that the seat of the disease is in the larynx, and due to an irritation of this organ by a micro-organism which has been cultivated, Moncorvo⁶⁷³ believes that the best results in treatment may be obtained by periglottic applications of a 10-per-cent. solution of resorcin, chemically pure, repeated every two hours. The application should be made with a throat-brush having a flexible curved-wire handle, and this should be introduced four or five times at each *séance*. The author claims that this method will often cut short an attack of pertussis quite abruptly; in some cases in twenty-four hours.

Naphthalin vapor, mentioned in the last ANNUAL, has been employed by Chavernac²⁰² with brilliant results, causing a rapid diminution in the cough and cure of the disease: 15 or 20 grammes (3 $\frac{3}{4}$ to 5 drachms) of naphthalin should be placed in an earthen dish, and heat applied so that the drug will be slowly vaporized. The fumes are pungent and provoke cough. The use of this agent is contra-indicated in subjects suffering from tuberculosis. Twenty years ago this remedy was in use under the name and form of Vichot's troches.

Leréfait²⁰³ reports 34 cases of whooping-cough treated with creasote, and the results were most satisfactory; a notable feature of the treatment being that the vomiting, which is such a distressing and exhausting accompaniment of this malady, ceased entirely in every case, in from one to five days after treatment was begun.

Bromoform, first recommended by Stepp, in 1890, has had many enthusiastic advocates during the past year. Duncan³⁰ reports cases, and has given a summary of four hundred and seventy-five cases reported by Stepp, Neuman, Loenthal, and Schepers, as follows: (1) bromoform in doses of 3 to 5 minims (0.19 to 0.32 gramme), three or four times daily, is a perfectly harmless remedy; (2) the attacks diminish in number and severity; (3) the first paroxysmal vomiting disappears in two or three days; (4)

nasal and other forms of hæmorrhage soon disappear; (5) it acts beneficially in complications, largely by giving affected organs a chance to rest; (6) it shortens the duration of the attack.

Cassell,⁶⁹ treated thirteen cases of pertussis with bromoform, with the result that the number and intensity of the attacks tended to diminish, but the total course of the disease was not shortened.

Nolden,⁵⁷ reported two cases of bromoform poisoning from administration of the drug for whooping-cough. Drzewiecki,⁶⁷³ corresponding editor of Kiev, Russia, affirms the value of open air, which has been insisted upon by so many observers, in the treatment of this disease, as of great value in diminishing the violence and number of the paroxysms.

On the theory that the action of ergot is central, Dewar¹⁹⁸ has employed it in pertussis, with the result, he says, that it has rarely failed to cure the disease in from ten days to three weeks.

Complications.—A case has been reported by Brown,²³⁹ where there was considerable distension of the stomach, the viscus pushing up the diaphragm, and so interfering with the action of the heart and lungs as to cause great cardiac and respiratory embarrassment. Deafness occasionally follows an attack of pertussis. Gellé,¹¹ in a case recently published, says that the lesion was situated in the auditory nerve, the integrity of the apparatus for transmission being evident. The case was very resistant to treatment. In a case of whooping-cough, in a child of 3 years, reported by Wicherkiewicz,⁷⁸⁸ there appeared, under the influence of a violent paroxysmal cough, extensive extravasation into the eyelids, and later ecchymoses into the skin of the neck and chest. Stammering, induced by an attack of pertussis, was treated by Lennox Browne²¹⁸⁹ by removing the adenoid growths which had formed, and shortening the uvula.

PAROTITIS.

The period of incubation has been observed by Jessop,² in a couple of cases, to be as long as three weeks; he noted, however, that the contact need be but slight in order to convey the poison, and that the disease may be transmitted for a period of time extending about three weeks after its first development.

Unilateral parotitis, complicating gastric ulcer in three cases, has been noticed in the Westminster Hospital during the past six years, and reported by Donkin,⁶ who was inclined to the belief

that the occurrence was due to the decomposition of retained secretion, owing to the blocking up of Stenson's duct, in connection with dryness of the buccal mucosa. A similar case has been reported by Nicholson, ⁶_{Dec. 19, '71} in which, however, a small amount of ice was allowed by the mouth, in addition to the rectal feeding, and the buccal mucous membrane never became dry; so that we must look elsewhere for a cause. It is a well-known fact that, during the early part of an attack of mumps there is a great diminution in the amount of salivary secretion, which is apt to be followed later by a hypersecretion; in one of these cases Simon and Prautois ³⁵_{Apr. 12} observed a great increase in the amount of the chlorides in the saliva. This salivary flux disappears rapidly under the administration of sulphate of atropia.

Schröder ³⁵³_{Dec. '71} has published the notes of a case, in which acute inflammation of both lachrymal glands occurred in a patient suffering from epidemic parotitis; this is probably the first reported case of such a complication, and the author believes that the affection of the two sets of glands were due to a common cause. Chavanis ²²⁶_{Nov. 15, '71} has reported a case of paralysis of the left side following mumps. The complication lasted two years, and is of particular interest, from the fact that it is believed to be the first case of the kind reported, although the complication is not unusual after other infectious diseases.

Two remarkable examples of recurrent parotitis, with xerostomia, occurring in women, have been reported by Hutchinson. ⁸⁰⁶_{Apr.} They may be regarded as examples of functional disturbance of the parotid gland under nervous influences.

F. M. W.

SCARLET FEVER, MEASLES, AND RÖTHELN.

By C. SUMNER WITHERSTINE, M.S., M.D.,

PHILADELPHIA.

SCARLET FEVER.

Etiology and Pathology.—Jon. Hutchinson, of London, ⁸⁰⁶_{Apr.} states that the explanation of the occurrence of scarlet fever, or of something exactly like it, immediately after operations, has long presented a problem which has puzzled surgeons. It is possible that it may be explained by the prolonged survival of quiescent germs, the activity of which is favored by the disturbance produced by the operation. He cites a case of this well-known class: A woman died of scarlet fever on the fifth day after an amputation. No case had occurred recently in the wards, but, on inquiry from her family, the curious fact was elicited that scarlet fever had occurred in her house several months before her admission. D'Espine and de Marignac ⁴⁵⁷_{July 1} have discovered a streptococcus, arranged in long, flexible chains, in the blood of a well-marked case of surgical scarlatina, in an adult who had severe angina, followed by general desquamation, lasting until the fortieth day. They demonstrated that the streptococcus found by them coagulated milk, in the same manner as the streptococcus obtained by Klein from the blood in cases of infantile scarlatina,—a property which was not possessed by any other microbe upon which they experimented. While they consider the microbe a distinct organism, they do not claim that it is the specific cause of scarlatina.

Kotchetkoff ⁵⁸⁸_{No. 41, VI}; ¹¹⁸_{June} has examined the blood in scarlatinal patients. He finds that: 1. The number of red corpuscles, normal at first, diminishes throughout the course of the disease, and only becomes normal several weeks after convalescence. 2. The number of leucocytes increases considerably, and is two to five times as large as in health, according to the gravity of the case. This increase probably begins two to three days before the eruption, reaches the maximum in four or five days, and then declines,

(J-1)

reaching the normal in five or six weeks. 3. The degree of fever, the lymphadenitis, otitis, nephritis, and other complications do not affect the number of the leucocytes. This increase affects the three forms of leucocytes (eosinophile cells, lymphocytes, adult elements).

J. F. Barbour, of Louisville, Ky., ¹_{2,14,17} in a review of this subject, says "that, while the argument from the analogy of this disease to others, the microbic origin of which is well established, is sufficient to convince us of this, and while there are certain clinical facts which can be but explained on this hypothesis, yet it must be admitted that no one has ever demonstrated this bacteriologically, or isolated the specific micro-organism."

Incubation.—Joh. Bókai ¹⁵⁸_{2,14,15} remarks that the period of incubation, so well established for measles, small-pox, and chicken-pox, is far from definitely settled for scarlatina. The older authors set it down as being from eight to fourteen days; later writers reduced it to four days. Bókai calls attention to Sörensön's report (1887) of thirty-eight cases, in several of which the period of incubation was not over twenty-four hours. Bókai has observed the facility of scarlatinal infection in diphtheritics who have been tracheotomized, notwithstanding all possible precautions. He cites two cases in point, in one of which scarlatina appeared sixteen hours after operation; both cases died within three days. C. G. Bacon, of Fulton, N. Y., ⁶¹_{2,11,17} from an observation of several hundred cases during the last forty years, does not remember a case where the invasion has been less than seven or eight days after the exposure.

Symptomatology.—J. B. Carver, of Fort Scott, Kan., ⁴³⁰₁ has noticed that, in families where scarlatina existed among the smaller children, the older ones, and in some cases the parents, would suffer only from the sore throat. He could not call to mind, in all the cases treated, a single instance where the rash was present in a patient over 16 years of age. D. Ssokolow, of St. Petersburg, ¹⁵⁸_{2,14,15} has made an investigation on sixty-five children from 1 to 12 years of age, to determine the condition of the skin in scarlatina and nephritis. His results show that in all stages of scarlatina the amount of perspiration is diminished; that the most important retention of water in scarlatina occurs at the onset of albuminuria, and especially before the appearance and during the progress of uræmic symptoms; and that the renal lesions of scarlatina are in causal relation with the diminution of the perspiration.

Bouveret, of Lyons, ⁹²_{Apr.} noted a secondary hyperpyrexia in this disease, without local complication, in three cases. In these there was a sudden secondary attack of very high fever on the ninth or tenth day, after the disappearance of the rash and at the commencement of the period of defervescence, the temperature rising rapidly to 41° C. (105.8° F.) and sometimes higher, with grave nervous symptoms, headache, jactitation, delirium, drowsiness, and a tendency to coma. These cases, which Bouveret differentiates from those cases of ataxic hyperthermia occurring during the eruption period, should not be confounded by reason of their gravity with certain cases described by Thomas and Gumprecht, ⁶⁹_{July, '88} under the name of "secondary scarlet fever" (*nachfieber*); in these latter cases the fever persists beyond the usual time for eight, twelve, or fifteen days, but without hyperpyrexia, properly so called, and, without grave phenomena, terminates by a defervescence more or less rapid, and is due to infection by streptococci entering the system through the tonsils. (*Vide ANNUAL*, 1889, vol. i, I-9.)

Ch. Talamon, ⁸¹_{Sept. 15} in connection with Lecorché, Hallopeau, and Rigal, has observed another variety of hyperthermia, quite distinct from that of Gumprecht, in the early appearance of the hyperthermia which is present from the beginning, even the first day, and sometimes without apparent remission until the disappearance of the rash; it differs from that of Bouveret in its persistence and duration,—eighteen to twenty days. Talamon concludes (1) that there is a form of scarlatina which may be called "prolonged hyperthermic scarlatina," characterized by the early appearance and long duration of the hyperthermia; (2) that the intensity and persistence of the fever are not apparently dependant upon any local lesion or complication; (3) that the high temperature is the essential element and constitutes the entire danger of this form; (4) that lotions and cold effusions are unreliable palliatives against this hyperpyrexia; the only efficacious treatment is the systematic employment of cold baths (method of Brand) every three hours, until the temperature declines below 39° C. (102.2° F.).

E. N. and W. S. Nason ²_{Apr. '80} report two cases in which acute gastro-intestinal symptoms were followed by death. They explain the severity of the symptoms—especially those referable to the gastro-intestinal tract—by supposing that in each case a very large dose of the poison had been imbibed, possibly through tainted

milk, which, at summer-heat, would form a suitable cultivation medium for the scarlatinal microbe, the products of whose action, when introduced into the stomach, etc., in large doses, might produce such symptoms.

Diagnosis.—Wharton Sinkler, of Philadelphia, ⁹ states that much confusion exists, in the minds of many members of the profession, as to the difference between scarlatina and some of the other exanthems. The scarlatiniiform variety of rubella (rötheln) closely resembles scarlatina in its general appearances, and one is very frequently taken for the other. Very often an attack of erythema from indigestion is mistaken for scarlatina, but, much more frequently, a mild attack of scarlatina is pronounced roseola, or erythema from indigestion. The Fulham Scarlet-Fever Case ² brought forward, at the trial, expert medical witnesses (officers in fever hospitals) on both sides, whose opinions in respect to the diagnosis of the case were conflicting.

W. H. Plaister, of Tottenham, Eng., ² declares his belief that the essential point in diagnosis is the tonsillitis, as cases must be very rare where it does not exist, even if the rash is of an unusual character. E. R. H. Cory, of Bournemouth, Eng., ² has noticed that, in influenza of the febrile type, one meets with cases in which there is a rash of a scarlatiniiform character, followed in a number of instances by more or less desquamation. In these cases he finds that it is not at all uncommon for the patient to complain of a slight sore throat. As a rule, the desquamation—sometimes branny, at others in large flakes—commences on cessation of the more-marked febrile symptoms,—say, on the second or third day; but it may occur later, and lasts but a very short time compared with that of scarlet fever, the peeling stage of which it closely resembles. He has not observed rash and desquamation in those instances of influenza occurring at sea, but on land he has frequently noticed them. In differentiating scarlet fever from rötheln, an editorial ⁹ observes that, in the latter, the throat symptoms, if present at all, are trifling and unlike those of scarlatina; if the rash resembles that of an atypical scarlet fever, the absence of the characteristic general disturbances points the way to a diagnosis.

Complications.—L. A. Wolberg, of Warsaw, ^{520, 108} at a meeting of the Warsaw Medical Society, communicated a very rare

instance of the simultaneous occurrence of scarlatina and small-pox in the same subject. A sickly boy, aged 7 years, was first attacked by scarlatina. A few days later the temperature rose still higher, while there cropped out variola pustules on the shoulders, and subsequently on the chest, extremities, neck, and face. Ultimately, the boy completely recovered from both of these diseases. During the discussion which followed, A. J. Malinowski mentioned two cases in this connection: one, a child of 3 years, fell ill with small-pox; twenty days later there appeared scarlatina associated with diphtheria. The other case, a child aged 8 years, was attacked with scarlatina; on the fifteenth day small-pox made its appearance.

E. J. Moure, of Bordeaux, ³_{May}, reports the case of a young man aged 20 years, who, on the tenth day of the disease, which was taking a normal course, presented dyspnoëic symptoms amounting almost to suffocation. By the aid of the laryngoscope, Moure discovered an abscess involving the base of the epiglottis and the anterior portion of the left ventricular band; there were, besides, œdema of the aryteno-epiglottic folds, intense pain,—which was of spontaneous origin and also produced by efforts at deglutition and external palpation,—and, lastly, complete aphonia. The abscess opened spontaneously and the patient got well. J. C. Bloodgood, of Philadelphia, ²⁸_{June} reports a case of malignant scarlatina complicated by laryngeal stenosis (character not stated) and general convulsions. The child died twenty-seven hours after the onset of the disease. It was a question, in this case, whether the convulsions were due to the scarlatinal poison acting on a susceptible nervous system (previous history of convulsions), or to carbon-dioxide poison caused by the obstruction. M. A. Philippoff, of Moscow, ¹⁵⁸_{B.14.H.6} reports that, of forty-five cases of scarlatina under his care during the epidemic of influenza, sixteen were complicated by that disease. Twitchell ⁵⁴⁶_{Aug. 15} reports a case complicated by basilar meningitis, enlargement of the sterno-mastoid muscle, nephritis, and peritonitis, which recovered.

Chambord-Hénon ²¹¹_{Sept. 11} reports persistent hiccough as a complication, appearing on the third day; the paroxysms coming on every two or three minutes, and persisting for seven days. The patient could not sleep, eat, or drink. During this period, the urine was very scanty,—200 grammes (6 $\frac{2}{3}$ ounces) in twenty-four hours. It

was high-colored, and deposited a large amount of sediment, which disappeared on boiling; no trace of albumen. The application of cloths, wet with cold water, was followed by an abundant flow of urine and the cessation of the hiccough. In a series of 100 cases reported by James W. Dudley, of Boston,⁹⁹ it was found that nephritis was present in 18 cases (8 severe), otitis media in 10, diphtheria in 6, pneumonia in 3, cervical abscesses in 3, inflammation of the joints in 3, measles in 2. Albuminuria was present at some time (most frequently early) during the disease in 49 per cent. of all the cases; it was slightly more common in males than in females. Early albuminuria maintained a pretty constant relation to temperature, being much more frequent in cases with high temperature. It was of much more frequent occurrence in adults than in children, when the temperature was the same, and of almost universal occurrence in adults with high temperature; it did occasionally occur in cases with a low temperature. Overcrowding and poor ventilation were not factors in its production. Early albuminuria was occasionally caused by or led to renal catarrh, very rarely to severe nephritis; catarrh was not apt to be developed into severe nephritis.

H. Moreau, of Bordeaux,⁷⁸⁰ reports, *in extenso*, a case complicated with diphtheritic angina, intense coryza, double otitis media, scarlatinal rheumatism, and endocarditis, which finally recovered. The most interesting feature in this case was, that an attack of pertussis, accompanied by bronchitis, which had continued for a year previous to the appearance of the scarlatina, disappeared *pari passu* with the eruptive fever.

Sequelæ.—Combemale and Lamy¹⁵¹ report the case of a boy of 6 years who, while desquamating, after an attack of scarlet fever, was attacked with pseudomembranous pharyngitis, accompanied by adenitis on both sides of the neck. The false membranes disappeared from the pharynx, but the swelling on the left side of the neck increased to a great size and fluctuated. The patient had fever in the evening, night-sweats, and diarrhœa for ten days. The abscess was then opened, and 300 grammes (10 ounces) of pus evacuated. Streptococci and staphylococci, the latter in large numbers, were found. The point of interest in this case is that tubes of agar-agar, inoculated with the pus, remained sterile; and a rat, into which were injected 2 cubic centimetres (32 minims) of

the pus, showed no trace of a purulent collection. Had the microbes secreted so large a quantity of toxins that their virulence had been at first diminished and then destroyed? L. H. Adler, Jr., of Philadelphia, ¹¹²_{Dec., '91} reports a case, occurring in the practice of Johnston, where the internal jugular-vein was ligated for profuse hæmorrhage, caused by a sloughing adenitis following malignant scarlet fever. John Ewens, of Bristol, Eng., ²⁶_{July} gives the history of an interesting case of spontaneous dislocation of the left hip-joint, occurring in the course of scarlatinal rheumatism, complicated by necrosis of the right tibia, and a partial dislocation of the right knee backward. Ewens performed an excision of the knee-joint, and Adams's operation on the left hip-joint, with good results.

N. S. Manning, of Birmingham, Eng., ⁶_{Aug., '13} describes the skin-eruptions which occur in septicæmia, following scarlet fever. R. Demme ⁶⁵⁰_{1814, 1820} observed a case where Basedow's disease suddenly appeared as a sequela. C. D. Früh ⁵⁹_{June, '13} reports two cases of scarlatina followed by typhoid fever. Charles M. Kerr, of Falls City, Neb., ⁷⁸⁶_{Sept.} reports a case of paralysis of the pharynx and œsophagus, following scarlatina anginosa. Thomas, of Leipzig, ¹⁹⁷_{Dec., '91} reports a case in which a number of paralytic phenomena appeared after a mild attack of scarlatina. One month after the eruptive disease there was noticed a feebleness of vision, caused by double optic neuritis, with some accompanying headache; paretic symptoms came on gradually in the limbs and the neck, but not in the ocular muscles or the soft palate, with moderate contracture, exaggerated reflexes, and slight anæsthesia, accompanied later by a condition of cerebral fever, with loss of speech and sphincteric control. After two months the cerebral symptoms, fever, and sphincteric paralysis disappeared. A voluntary trembling in the upper limbs was then observed, followed by progressive improvement of the symptoms until a month later, when the patient became quite well. The right limb was still moved with difficulty; the condition of the eyes was improved, except the papillar atrophy, which persisted. The cause of these symptoms was thought to be an action of the scarlatinal virus, or of its products, either upon the spinal meninges or the cord itself.

Auto-Infection and Relapse.—Bates, of Bradford, Eng., ²_{Apr., '16} notes the case of a girl, aged 19, who, during convalescence from apparently typical scarlatina, complained of slight joint-pains. On

the eleventh day the fever and rash recurred; on the fourteenth day smoky, albuminous urine, containing blood and casts, was noted, and on the seventeenth day erythema nodosum on the shin. On the twenty-first day the rash came out again, more livid in color, the temperature fell, and, after suppression of urine and appearance of œdema, hot-air baths established diuresis. The patient desquamated until the eightieth day. Bates explains the case by auto-infection. Hugh Jones, of Dolgelly, North Wales,² reports a similar case. E. Jeanselme,²⁰⁰ in a classical paper, divides these cases into three classes,—pseudo-relapse, relapse, second attack,—following the example of Thomas, of Leipzig. Pseudo-relapse would describe cases in which the rash returned before the disappearance of the fever, which is in some cases abnormally prolonged. A relapse is a reproduction, after the apparent establishment of convalescence, of all or part of the symptoms which characterized the initial attack (40 cases observed). A second attack is a re-appearance of the disease some time after a complete cure of the first attack (32 cases observed); this is explained by a loss of immunity. Lucas-Championnière, of Paris,²¹² reports a case of scarlatiniform erythema, resembling the last variety, in which renal congestion of reflex origin occurred. The eruption, condition of the tongue, etc., were so typical that it was impossible to make any other diagnosis than that of scarlatina. The early appearance of desquamation, often simultaneous with the eruption, is, according to Lucas-Championnière, a diagnostic sign by which we may differentiate this disease from true scarlatina.

Infection.—A correspondent,² writes that he has seen several cases in which the disease was taken upon exposure to contact with a patient in the first day of the disease. In two cases, the only known exposure was to a patient suffering only from prodromata. P. H. Walker, of Lechlade,² gives five cases of infection after exposure to a patient during the prodromata. W. P. Howle, of Oran, Mo.,⁶¹ cites a case of infection following exposure to a patient three days sick. He makes the interesting observation that in intensely malarious districts scarlet fever loses its extreme virulence. Falconer, of Hamilton, Ohio,⁵⁴⁶ gives an instance in which the house had been fumigated for two days after a child had died from this disease, and yet, nine months afterward, the house was used as a school, and an epidemic occurred.

Treatment.—Vidal ³⁹⁹_{No. 49} recommends, in the treatment of this disease, large doses of liquor ammonii acetatis. He gives, as a dose, 1 gramme (15 minims) for each year of the patient's age; yet, in adults, 35 grammes (9 drachms) must not be exceeded. The remedy may be given in elder-flower infusion. Ziegler ⁴_{Jan. 11} puts his scarlatinal patients upon a milk diet from the very first, and in over one hundred cases has not seen a renal complication. During the first few days, when anorexia is complete, the child is given a little milk diluted with mineral water. When the appetite returns, the child is given from a pint to 3 quarts ($\frac{1}{2}$ to 3 litres) of milk daily for the first three weeks, the milk being previously boiled. Now and then the child may be permitted to eat a piece of bread or a biscuit. This diet is continued to the end of the third week, when a change is gradually made to the ordinary food. Henry Noble Joynt, of Bradford, Eng., ¹⁶_{Dec. 1, '91} believing that the scarlatinal germs enter the body chiefly through the mouth and nose, advises vigorous, local, antiseptic treatment of the throat and nares. He advises the use of a strong solution of boric-acid in glycerin, prepared and used as recommended by Manning (ANNUAL, 1892; vol. i, I-10). After irrigating the throat and nares, he paints the ulcerated structures with the thick boroglyceride, with iodo-glycerin (1 in 7), or with thymol-glycerin (1 in 10-50). Joynt does not consider the internal antiseptic treatment very satisfactory, but considers thymol, in full doses, dissolved in alcohol or olive-oil, given with nux vomica and ammonia, the most useful.

The most comprehensive paper on the treatment of scarlatina during the past year is that of J. Lewis Smith, of New York, read before the American Pædiatric Society. He states ⁵¹_{Dec. 7, '91} that during the first week such complications as cervical adenitis, cellulitis, abscesses, otitis media, etc., are common. These may be rendered less frequent and severe by frequent application to the nasal, post-nasal, and faucial surfaces of non-irritating germicide remedies. He advises frequent spraying of the fauces and nares with a solution of hydrogen peroxide, 1 part to 4 of water for the fauces, 1 part to 8 of water for the nares, used hourly or every half-hour; or of corrosive sublimate, 2 grains (0.13 gramme) to the pint (500 grammes) of water, employed every two hours, within non-poisonous limits; or some other non-irritating but efficient disinfectant. A nasal injection should always be warm.

He has used with good results:—

R	Acidi borici,		
	Sodii boratis,	. . . . .	ss 3ij (8 grammes).
	Sodii chloridi,	. . . . .	3j (4 grammes).
	Aque.	. . . . .	Oj (500 grammes).
M.	Sig. : A teaspoonful to be injected into each nostril hourly.		

Cold applications along the sides of the neck, as muslin frequently wrung out of alcohol and ice-water, in cases attended by high temperature, are useful adjuncts. Eclampsia is always a very dangerous complication, occurring either early in the disease, when the temperature is dangerously high, or in the declining stage of the disease, when its cause is usually uræmia. The former is best treated with cold water in one form or another, which, when judiciously employed, is not attended with collapse. In hyperpyretic cases, whether sthenic or asthenic, attended by pronounced nervous symptoms, an ice-bag or cloths wrung out of ice-water are applied over the head as long as the temperature remains at or above 103° F. (39.44° C.). In sthenic cases the limbs should be frequently sponged with cold water containing alcohol or vinegar. Sodium salicylate is condemned for its tendency to produce albuminuria and nephritis. Veratrum viride, antipyrin, and antifebrin are dangerously depressing and liable to cause collapse. Two antipyretics, however, may be used with safety for the reduction of the temperature when dangerous symptoms, as restlessness, jactitation, and delirium (which are forerunners of eclampsia or coma) are present. These are aconite and phenacetin. The average dose of aconite is about 3 minims (0.20 gramme) every three hours. A child of 8 years could take one-third and one of 12 years one-half of this dose. Phenacetin may be given in $\frac{1}{2}$ -grain (0.03 gramme) doses to a child of 18 months, and in 1-grain (0.065 gramme) doses to a child of 3 to 5 years, every two or three hours, with an alcoholic stimulant. In cases attended by marked depression phenacetin should not be prescribed, or it should be prescribed in small doses, its effects being watched and stimulants given. For the nervous symptoms, such as restlessness and jactitation, which might lead up to convulsions, the bromides can be safely administered, prescribed in doses of 5 grains (0.33 gramme) every hour or two, for a child of 3 to 5 years. To prevent the formation of ante-mortem clots, 3 grains (0.20 gramme) of ammonium carbonate in $\frac{1}{4}$ wineglassful of milk should be given every hour or half-hour to

a child of 5 years. Musk, in doses of $\frac{1}{4}$ grain to 3 grains (0.05 to 0.20 gramme) every two hours is useful, but inferior to camphor in doses of 1 to 2 grains (0.06 to 0.13 gramme) every two hours. Scarlatinous rheumatism, whether of microbic origin or not, is in itself not dangerous, but the endocarditis and pericarditis, which sometimes occur in connection with it, are serious complications. It does not seem improbable that these complications may be prevented or rendered milder by the germicidal treatment mentioned. Nephritis is best met by keeping the patient in a warm room (70° to 75° F.—21.11° to 23.88° C.), avoiding draughts of air during desquamation, or until two or three weeks after the rash has disappeared. In the discussion which followed, Fruitnight, of New York, summed up the prophylaxis of nephritis thus: "Warmth, rest, milk diet." D. Ssokolow¹⁵⁸_{2,14,24} recommends that patients be kept in a dry, warm air. He has found that warm baths increase the action of the skin, while fatty inunctions diminish it. He advises, therefore, that warm baths, at a temperature of 30° R. (99.5° F.—37.5° C.), be employed early, and that fatty inunctions be avoided.

MEASLES.

Etiology and Pathology.—P. Canon and W. Pielicke, of Berlin,⁴_{Apr. 18}; ²_{Apr. 23} point out that "cocci have been found by various investigators in the lungs of persons who had died of pneumonia complicating measles; and that Babes²¹²⁹_{26, p. 621} found micro-organisms not only in the lungs, but in the lymphatic glands, the mucus of the nasal fossæ, the conjunctival secretion, and in the exanthematous patches themselves. He also found cocci in the blood obtained from the papules, and in one also very short bacilli. In cultures he obtained streptococci which bore a resemblance to the staphylococcus pyogenes. Canon and Pielicke made stained preparations of the blood of fourteen patients suffering from measles, and in all cases they found "one and the same" bacillus. The preparations were made in the same way as in Canon's researches on influenza,²_{Jan. 16} and were stained with an eosin-methylene blue solution. They now generally employ a solution composed as follows: concentrated watery solution of methylene blue, 40.0; $\frac{1}{4}$ -per-cent. eosin solution (in 70-per-cent. alcohol), 20.0; distilled water, 40.0. The preparations were placed for from five to ten minutes in absolute alcohol, and then from six to twenty hours in

an incubator at a temperature of 37° C. (98.6° F.). The following solution was also used with advantage: concentrated watery solution of methylene blue, 80.0; $\frac{1}{4}$ -per-cent. eosin solution (in 70-per-cent. alcohol), 20.0. From two to three hours in an incubator suffice for staining. In the preparations the bacilli were found stained blue, sometimes uniformly, but frequently much more deeply at the ends than in the middle; sometimes only the edges of the middle portion were stained. The size of the bacilli is very variable; sometimes they are as long as half the diameter of a red blood-corpusele; sometimes they are quite small, and have the appearance of diplococci; between these two extremes they show several gradations in size. Occasionally they are of extraordinary length, almost equal to the diameter of a red corpusele; in that case they do not stain uniformly, but present three or four colorless spots alternating with the stained portions. As a rule, this form of organism does not stain deeply, the ends, in particular, often showing a very slight tinge of blue. These bacilli were frequently slightly bent, and were found only in preparations made toward the end of the disease (sixth day). The authors believe the bacillus found by them in the living blood in these fourteen cases of measles to be of a specific kind, and to be the true exciters of the disease. They are found in very variable numbers, the first two or three preparations of one specimen of blood sometimes showing only a few bacilli, while, on the other hand, the field was sometimes packed close with them at the very first examination. They frequently occur singly, but, in the majority of cases (twelve out of fourteen), they were arranged in larger or smaller clusters. Their arrangement in the clusters presented nothing characteristic except that they often showed a tendency to lie parallel to each other; in other cases they lay close behind each other and formed obtuse angles. The bacilli were found during the whole course of the disease, and, in one case, even three days after defervescence; in this case they had been present in unusually large numbers at the period of crisis. As a rule, the bacilli were found most abundantly at the time of defervescence. In addition to the fourteen cases referred to, the authors examined the blood of seven children who had had measles just before, and in some of whom the rash had not entirely faded away. The results of the examination were negative. They also examined, about ten hours

after death, the blood of a child who had died of measles without any lung complication, but the presence of the bacilli could not be determined with certainty; in this case the blood had not been examined during life.

“Some of the preparations were stained by Gram’s method; the bacilli remained unstained, but were as distinct as the red blood-corpuscles. Bacilli of the same shape as those found in the blood were seen in the expectoration and in the nasal and conjunctival mucus of patients suffering from measles. In all cases, before the preparations were made, blood of patients with measles, obtained by pricking the finger, was inoculated in glycerin-agar, blood-serum, or milk (woman’s), but they did not succeed in cultivating the bacilli on these nutrient media. More recently they used chiefly bouillon, inoculating each test-tube with from one to three drops of blood; generally from six to ten tubes were used for each experiment. In three cases they found, in the inoculated bouillon, bacilli which agreed in all points with those found in the blood, but could not be further cultivated on glycerin-agar, blood-serum, or bouillon. The bouillon remained clear for a time, there being a sediment at the bottom of the tube which was partly deposited from the inoculated blood; after some days a slight opacity became visible, and small flakes formed which rose on shaking the tube. In these bouillon cultures the bacilli were found in different forms, sometimes uniformly stained, sometimes resembling diplococci, sometimes more like diplobacilli. Some of them exceeded in length the longest seen in the preparations of blood. The bacilli in these bouillon cultures do not stain by Gram’s method, and they display only slight power of independent movement. In one of the three cases referred to, these bacilli were found in large numbers in all the tubes of bouillon (four in number) which had been inoculated with blood; inoculations made at the same time, on glycerin-agar and blood-serum, remained sterile. The inoculation was, in these cases, made toward the end of the fever, at the commencement of the crisis; in the blood preparations made at the same time, the bacilli were found in considerable numbers. This was the case in which the bacilli were found in the blood three days after defervescence. From the same child blood had been drawn into sterilized tubes, and, after having been kept two days in the incubator, inoculated in bouillon and agar. In one

of the tubes containing bouillon bacilli were also found, while glycerin-agar inoculated with the same tube remained sterile; here, also, all attempts at further cultivation failed.

“ Finally, an attempt was made to cultivate these bacilli on blood-serum glycerin-agar by the method employed by Wertheim⁶⁹ for the cultivation of gonococci, but without result. The blood-serum came from a person who was said to have passed through a severe attack of measles seven years previously, and the authors argue that there are special advantages in obtaining this nutrient medium from the blood of persons who have never had an attack of measles, and have, therefore, not acquired more or less immunity against that disease.

“ Canon and Pielicke conclude by stating that the bacilli found by them in the blood of patients suffering from measles are essentially different from the micro-organisms hitherto described in connection with that disease. They admit, however, that Babes’s “*bacilles très courts*,” which he does not further describe, may be identical with theirs; but he only mentions having found them once, and seems to have attached no importance to the matter.”

P. Murray Braidwood, of London,⁶ claims priority in the discovery of the measles bacillus, having shown prepared specimens of them as early as May, 1878, at a meeting of the London Pathological Society. The validity of his claim is vouched for by William Squire, who refers to the record of the same.²¹⁸⁰ Albert Josias³¹ examined the blood in twenty-four severe cases of measles, according to the method detailed by Canon and Pielicke, with entirely negative results. Josias doubts, therefore, the specific rôle attributed by them to the bacillus which they have described. Laveran³ has made similar examinations without being able to detect this bacillus. Le Dantec⁷⁰ has found, in post-mortem examinations of patients dying from measles, a general infection by streptococci.

Doehle⁸⁵⁴ makes a preliminary report upon this subject, giving the results of the examination of the blood in eight cases. The blood employed was taken on the first or second day after the appearance of the exanthem, and in the fresh state showed motile bodies $\frac{1}{2}$ to 1μ diameter (sometimes larger), composed of a central nucleus, or two nuclei, surrounded by an envelope of clear-looking substance, the whole more or less oval in shape. They were found

both in the red corpuscles and in the plasma; immediately after the outbreak of the exanthem, however, in the former only. They exhibited distinct movements in either situation. On one occasion one of these bodies was seen to emerge from a corpuscle and traverse the field with great rapidity. The author also made dry preparations of the blood, using especially a double stain of orange and gentian-violet. Structures composed of a violet-colored nucleus, with colorless envelope, were seen lying in the yellow-tinted corpuscles and also outside them. Two nuclei were sometimes seen in apposition, inclosed in a single envelope. In addition, other bodies, oval in shape and containing a lenticular nucleus, or two such nuclei, were seen in these colored specimens; and, lastly, forms larger than any of the above—from $1\frac{1}{2}$ to $2\frac{1}{2}$ μ in diameter—were apparent; these were elliptical in shape, with contents divided into four parts by lines of section at right angles to each other. These several structures were found to be provided with flagella. They represent, in the author's opinion, different stages of development of a parasite, which, further, may with much probability be regarded as the cause of measles.

L. B. Anderson, of Norfolk, Va., ¹⁸⁶_{Apr.} believes that measles is the incubation of a specific ptomaine in the blood. Jon. Hutchinson, of London, ⁸⁰⁸_{Apr.} explains the etiology of cases occurring after operations by the prolonged survival of quiescent germs, the activity of which is favored by the disturbance produced by the operation. He reports a case of this variety.

Incubation.—Observations by Martin-Durr, of Paris, ³¹_{Dec. 17, '91} on the incubation period of measles confirm those of Gillet, as recorded in the ANNUAL of 1892 (vol. i, I-15). He notes this case: The patient, a pregnant woman suffering from measles, was admitted to the hospital; the hospital externe contracted the disease from her, being exposed to the contagion about ten minutes; eight days from the day of contact the prodromal symptoms (epistaxis, stiffness of the muscles, etc.) appeared; four and a half days later, or twelve and a half days after the day of contact, the eruption appeared. The woman aborted, and in the lying-in ward transmitted the disease to one infant, who, in turn, transmitted it to a second.

Complications.—A. J. Malinowski, of Warsaw, ⁵²⁰_{Nov. 17} ¹⁰⁸_{June} reports three interesting cases of measles combined with other exanthemata: A child 3 years old contracted measles; on the nineteenth

day small-pox supervened. Another child of $3\frac{1}{2}$ years was found to be suffering from measles on June 16th. On July 7th the patient contracted erysipelas. On September 19th another attack of measles occurred, followed on September 22d by scarlatina, and, on October 7th, by small-pox. The infant died. A third child, aged 8 years, was admitted with measles on February 27th. On the next day the rash became complicated with that of small-pox, while on March 3d there supervened scarlatina with diphtheria. On the tenth day after admission the child died.

Wm. Gemmell, of Glasgow, ² reports a case of menstruation occurring during measles in a girl aged 9 years. There was a discharge of blood from the vagina amounting to $\frac{1}{2}$ drachm (30 grammes), and the microscope showed it to consist chiefly of blood-corpuscles, squamous epithelium, and *débris*. The discharge continued for five days, and gradually ceased as the eruption faded. It did not re-appear after the subsidence of the measles rash. Bouffeu ⁴⁵⁴ reports two similar cases in adults. He is of the opinion that the appearance of the menses hastened recovery.

Galliard, of Paris, ¹²¹ reports the case of a young woman, a virgin 21 years of age, who, on the twelfth day of a severe attack of measles accompanied with menorrhagia, was seized with a general peritonitis, to which she succumbed on the twenty-fifth day. At the necropsy there was found a purulent peritonitis with streptococci, due to rupture of a suppurating ovary on the right side. The left ovary and the uterus were healthy. Galliard remarks that the question may be raised whether the accident was a complication of measles or a secondary infection. He is inclined to the latter opinion.

E. Adenot ⁴¹, ¹²¹ reports a case of herpes zoster in the tract of the radial nerve, appearing before the measles eruption had completely faded. The patient was seized with sharp pains in the right side of the chest, extending to the right shoulder and almost preventing movement of the joint. The pain next invaded the forearm, especially on its outer and under side; there was a painful prickling in the thumb and index finger. The whole upper extremity was affected with decided paresis. Four or five days later an eruption of herpetic vesicles appeared upon the dorsal surface of the digits above mentioned, which were also the seat of a very disagreeable formication. Sensibility was intact. The circumflex

and radial nerves were evidently influenced by the measles infection.

J. J. Brachio, of Multan, India, ²⁸⁹_{June} reports an interesting case of hyperpyrexia in measles, occurring in an infant 19 months old. The temperature reached 109° F. (41.6° C.), and remained there for an hour and a half; then it gradually dropped. The child died on the following day.

Sequelæ.—Herman B. Allyn, of Philadelphia, ⁹_{Nov. 21} has collated forty cases of paralysis following measles. He adds one of his own, which occurred in a boy 13 months old. The child had measles of moderate severity. As the eruption faded, catarrhal pneumonia developed. When convalescent from the latter, it was discovered that he was paralyzed on the left side. There was right ptosis; the pupils were contracted; there were left facial paralysis and left hemianæsthesia; the temperature was slightly elevated and the pulse was arrhythmic; the breathing was Cheyne-Stokes in character. About twenty months later considerable improvement was shown, most marked in the facial palsy. There were increased power in both arm and leg, and absence of contractures, but the mental condition was not encouraging. Speech and articulation were much affected, the child being very slow in acquiring words. Allyn adds: "The fact that most of the cases of palsy following measles occur in about the second week of convalescence seems to indicate that a change has been taking place in the arteries, dating from the active stage of the disease, and that, when this arterial change reaches a certain point, we have an apoplexy, a leakage of serum, or an occlusion of a number of arteries from general arteritis. While the palsy following measles cannot be ascribed to exhaustion, there is reason to think that special susceptibility to nervous affections is a predisposing cause."

J. S. Carpenter, of Pottsville, Pa., ⁹_{Feb. 13} adds another case to the forty-one cases mentioned by Allyn. In this case the upper and lower extremities on the right side were affected. There was no aphasia in this case, and recovery followed the administration of strychnine in ascending doses.

Tropical Measles.—Under this name, James Cantlie, of Hong Kong, ⁹_{June 22} describes a disease of an unclassified type, which was prevalent amongst the foreign residents of Hong Kong during the months of September and October, 1888. Cantlie defines the

disease as follows: *Rubeola tropica* is a specific eruptive fever, the primary rose-red rash appearing on the face and neck on the second day of the illness; the second rash, miliary and papular, on the body, face, and occasionally on the limbs, on the fourth day. The third rash—of small, coalescent wheals—appears on the arms and legs, or legs only, on the sixth day, when the fever subsides. The more severe form of the disease chiefly attacks adults. It is epidemic, contagious, but seldom associated with catarrh or desquamation, and characterized by the intensity of the pains in the back, head, and orbit, on the third and fourth days of the illness. The period of incubation is, in ascertained cases, under seven days. For three days after the disappearance of the rash the patient can eat but little, and is so weak that he feels disinclined to attempt to walk. Soreness is experienced in the back and sides, but the headache and pain in the orbit are gone, although giddiness is complained of. A marked symptom in all is complete absence of taste. A further sequela is a subcutaneous hæmorrhage from the capillaries of the legs; in severe cases, so constant is this that it might be classified as a fourth rash, appearing on the sixth or seventh day. A peculiar elevation of the temperature took place in seven, *i.e.*, one-seventh of the cases observed. Once a week for three or four weeks an elevation of temperature, headache, and restlessness disturbed the patient, for about 12 hours; the temperature rose no higher than 100° F. (37.77° C.) in any case. In a few cases, boils of a most painful nature, in crops lasting for about fourteen days, followed immediately upon the subsidence of the fever. Well-marked desquamation took place three weeks after convalescence in three cases. One thing that impressed Cantlie was that the epidemic had a mild beginning, grew in severity, and then gradually diminished in intensity as the end was reached.

RÖTHELN (RUBELLA).

Polymorphism.—John R. Hillsman, of Trezevant, Tenn., ⁷⁴₈₉₇ records his experience in three epidemics of this disease. The cases in the first were almost all typical,—the eruption, the fever, the enlarged post-cervical glands, and the slight indisposition presenting an array of symptoms pathognomonic of röteln; and there was no difficulty of being sure of the diagnosis. In the second epidemic there was a close resemblance to measles; in fact, some

of the cases had been isolated, and, had no aid been received from the history of others prevailing, a diagnosis would have been difficult or impossible; the catarrhal symptoms and eruption were very much like measles, but, testing a number of the cases, and aggregating the symptoms, together with the fact that the disease attacked indiscriminately those who had previously had measles, the diagnosis was made clear that the disease was rubella. The third epidemic closely resembled scarlet fever.

J. P. Crozer Griffith,¹¹² Eugène Didier,²¹² and others note the polymorphous character of this disease.

Diagnosis.—An editorial⁹ on the differential diagnosis of this disease, measles, and scarlatina states that: "In contrast with measles and scarlatina, röteln presents, as a rule, slight and transient fever or other constitutional disturbances, often so trifling as to attract little attention, often absent altogether. The eruption appears early; it is in many cases the earliest manifestation. It is irregular in character and distribution. It commonly appears first about the head and face, and sometimes resembles that of measles; but the macules are of a brighter pink and do not tend to the crescentic arrangement; less often it resembles that of scarlet fever, but it is paler. It appears and disappears irregularly over the surface, so that a fresh patch may show itself just as a patch elsewhere is fading. Catarrhal manifestations are slight, and, as a rule, restricted to the upper air-passages. The lymphatic glands of the neck are more or less swollen, the posterior rather than the anterior chains being infiltrated; and this is an early symptom. At the end of four days, sometimes as late as the fifth or sixth day, the rash vanishes without desquamation, save where it has been unusually intense.

"Throat symptoms, if present at all, are trifling and unlike those of scarlatina; catarrhal bronchitis does not occur; the initial fever, when present, subsides slowly rather than abruptly, and is insignificant; the temperature does not often reach 101° F. (38.3° C.); moreover, the pyrexia is transient, differing in all these respects from that of measles and that of scarlatina. Chill, convulsions, and vomiting do not mark the invasion. If the eruption suggests measles of a mild type, the constitutional symptoms declare for röteln; if the rash resembles that of an atypical scarlet fever, the absence of the characteristic general disturbances

of the latter points the way to a diagnosis. Cases of rötheln occur, as in the other eruptive diseases, in which, for a time, the diagnosis is impossible; but, in proportion as we attach importance to the broad, distinctive traits of the disease and ignore minor symptoms, the number of these cases rapidly diminishes."

A. D. Ayer, of Charlottesville, Ind.,⁹; H. T. Webster, of Oakland, Cal.,⁵⁴⁷ and others insist that an important symptom, in reference to diagnosis, is the tendency of the lymphatic glands to become enlarged. J. P. Crozer Griffith, of Philadelphia,¹¹² quotes Atkinson,²¹³¹ who speaks of the constant occurrence of glandular enlargement in rubella, but says that it is likewise very often observed in measles. Moreover, Townsend,⁹⁰ avers that enlarged cervical glands are sometimes found in rubeola and sometimes not in rubella. Finally, Swift,²¹³¹ though regarding cervical adenitis as almost pathognomonic of rubella, states that, in an epidemic of measles under his observation in 1886, 24 out of 27 cases exhibited a glandular enlargement exactly similar to it. Griffith adds 50 cases of rubeola in which is recorded an enlargement of the superficial cervical glands, and 11 in which the posterior auricular glands were involved. Griffith concludes that, although this special glandular enlargement is a very constant symptom in rubella, it is probably nearly as frequent in rubeola (though not so marked), and that it presents by no means as great diagnostic importance as is usually supposed.

Rötheln and Roseola.—A. J. Harrison, of Bristol, Eng.,⁶⁹⁷ records briefly 12 cases, 7 of which had the rash of rötheln first; and then, in periods varying from three to ten days, a secondary erythematous eruption, followed in six instances by more or less desquamation, and in one by none; and 5 other cases, in which only the "red rash" appeared, exactly resembling the eruption in the first lot of cases, and followed by more or less desquamation. In 2 of this last lot there was a very distinct history of previous scarlet fever. In no one of the 12 cases was there any kidney complication, not even a trace of albumen, although it was daily tested for; and much as some of the cases resembled scarlet fever at the onset or in their secondary development, there were no cases of this fever in the locality until quite late in the outbreak. No case displayed the usual "strawberry" tongue of scarlatina, and, in all cases except one, convalescence was very rapid.

RHEUMATISM AND GOUT.

By N. S. DAVIS, M.D., LL.D.,
CHICAGO.

ACUTE AND CHRONIC RHEUMATISM.

Etiology.—During the past year several observers have given attention to the connection of *bacteria* with different grades of rheumatism. Edward F. Grün, of Putney, ⁶_{May}, says: “I have found almost invariably that in acute rheumatism the blood is charged with bacteria in the form of minute cocci to a point which might almost be called saturation. These cocci are easily to be seen after floating the cover-glass, upon which the blood is taken, for a period of not less than four hours in a warm solution of methylene blue.”

Hermann Sahli, of Bern, ²¹⁴_{No. 1} reports having failed to find any bacteria in the serous effusions of acute articular rheumatism during the life of the patients. But a girl, aged 16 years, having died during a second attack of acute rheumatism of the knee-joint, complicated with sero-fibrinous pericarditis and pleurisy, recent endocarditis and enlargement of the bronchial lymphatic glands, he inoculated several tubes and plates of agar and gelatin with material from the synovial membrane of the affected knee, the pericardial and endocardial membranes, the bronchial glands, and the blood, taken about fourteen hours after the death of the patient. All the specimens developed pure cultivations of the staphylococcus citreus abundantly, except those from the blood, in which the number of cocci were few. From these results, Sahli infers that the staphylococcus citreus is the pathogenic microbe of acute articular rheumatism.

Edward Blake, London, ²⁶_{Jan. 1} relates several cases to illustrate “the sapræmic origin of rheumatism,” but does not isolate or point out any particular microbe. Raymond and Netter, of Paris, ⁸_{Feb. 10} relate cases of infectious pseudo-rheumatism, in which the well-known streptococcus pyogenes was found in the affected articula-

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tions and in the internal viscera, but only where there was more or less suppuration. M. A. Bécère, of Paris,²⁴ relates two cases of gonorrhœal rheumatism, one in a child of twenty months and the other a girl of near six years. Both had purulent secretion in the vulva, in which the gonococcus was found. Hermann Goldenberg, of New York,¹ relates the case of a female child, aged 2 years, with well-marked gonorrhœal rheumatism in both upper and lower extremities, coincidently with a purulent discharge from the vulva containing gonococci. Jacquet, of Paris,³ alluding to gonorrhœal rheumatism in both children and adults, claims that the rheumatic symptoms are not due to any one cause or microbe, but may be caused by the toxins developed by the gonococci in the urethra or by the microbes of pyæmia and septicæmia. Gerster, of New York,¹⁰¹ claims that the arthritic symptoms described as gonorrhœal rheumatism are not caused by the specific microbe of gonorrhœa, but by the ordinary pyogenic germs that accompany the urethral discharge or suppurative discharges from any other source, as seen in patients who have never had gonorrhœa.

Pathology and Pathological Anatomy.—Albert Robin, of Paris,⁶⁵ in a clinical lecture, declares that acute articular rheumatism is a disease characterized by rapid deglobulization of the blood.

A. E. Garrod, of London,² in a paper read to the Royal Medical and Surgical Society, gives the results of eighty examinations of the blood of twenty rheumatic patients, taken at different stages of their progress, as follows: "An attack of rheumatism was always attended with a considerable diminution of the number of red corpuscles, which commenced very early in the attack. When convalescence set in the lost corpuscles were rapidly replaced. In acute cases the loss of red corpuscles was usually about 1,000,000 per cubic millimetre. The rapidity of the diminution and repair was such that, within as short a period as ten or eleven days, 1,000,000 corpuscles might be lost and replaced." Relapses after convalescence were attended by fresh diminution of the red corpuscles; but in prolonged attacks the diminution did not continue progressive, the number remaining at about the same low level. He found "no real connection between the variation of the red corpuscles and the temperature curve, the blood changes being equally marked in afebrile cases. Indeed, these variations afforded

a far more delicate index than did the temperature chart of the activity of the rheumatic process." In a second paper before the same society ^{May 23} Garrod gave the result of his investigations regarding the white corpuscles of the blood in rheumatism. He said that "in every case of acute rheumatism examined there was a distinct increase of white corpuscles, although there was never any extreme degree of leucocytosis. The highest number observed was nearly 20,000 white corpuscles per cubic millimetre," the number in healthy blood being between 6000 and 7000. The rapid increase of white corpuscles commenced very early in the rheumatic attacks, and declined equally rapidly in the convalescence, keeping closely parallel with the diminution and replacement of the red corpuscles, but apparently more influenced by the degree of febrile heat. The examinations of Garrod were made with commendable care and exactness, and demonstrate very clearly the rapid loss of the red corpuscles of the blood and the absolute increase of the white corpuscles during the progress of acute rheumatism, without regard to the local structures involved, and without notable change in the form or structure of the corpuscles themselves.

I. E. Atkinson, of Baltimore, ^{Dec. 71} in a paper read to the Association of American Physicians, related several cases of acute rheumatic fever, accompanied by bradycardia, or slow pulse. He states that in much the larger number of cases the bradycardia occurs during the convalescence, and is then the direct result of the febrile action in depressing the innervation of the muscular structure of the heart. When it occurs during the active stage of the rheumatism, he thinks it caused by coincident inflammation of the cardiac structures, and thereby involving the inhibitory nerves in undue excitement.

D. H. Williams, of Knoxville, Tenn., ^{July 23} in a paper read to the Tennessee State Medical Society, gives the results of a clinical and statistical study of eighty-four cases of acute articular rheumatism. In regard to its pathology, he says that it "is a specific disease due to some morbid principle or infectious agent circulating in the blood." And in proof that it is some acid factor, he "noted a constant acid condition of the urine and a neutral or acid state of the saliva in 80 per cent. of the cases examined."

Treatment.—Williams, in the paper from which we have just quoted, claims that the best results are obtained by giving a mercurial cathartic in the early stage and sodium salicylate in 6-decigramme (10 grains) doses every four hours, until the hyperacidity of the fluids of the body is neutralized, and then continued in smaller doses until convalescence is well advanced. In very severe cases he sometimes gives 1-gramme (15 grains) doses at first, or the 6-decigramme (10 grains) doses every two hours, and thinks it more efficient than any other plan of treatment. In thirty-six of his eighty-four cases his treatment was commenced during the first six days of the attack, and only one developed any cardiac complications during their progress. In the remaining forty-eight cases in which the sodium-salicylate treatment was commenced at a later stage, twenty-one developed cardiac complication, three died, and eight were improved but passed from observation. There has been much greater unanimity during the past year, on the part of contributors to medical literature, in commending the use of salicylates in the treatment of acute articular rheumatism, than at any previous time. The chief differences relate to the mode of administration. Thus, Marcal Baudouin, of Paris,⁹⁹ in his report concerning the treatment of acute articular rheumatism in the hospitals of Paris, represents Dujardin-Beaumetz and Talamon as giving at the beginning 1 gramme (15 grains) every two or three hours until the active symptoms begin to abate, while Straus gives only two doses a day of 3 or 4 grammes (45 or 60 grains) each, dissolved in peppermint-water. Bouchard gives the sodium salicylate to the extent of 5 grammes (75 grains), supplemented with twice that quantity of bicarbonate of sodium, each day. In the New York hospitals,⁵⁹ the sodium salicylate is given with equal liberality and with satisfactory results. Dujardin-Beaumetz and Barth regard the liberal use of the salicylates as contra-indicated in pregnancy and renal obstruction, as in Bright's disease. It should be kept in mind also that the foregoing treatment with the salicylates is efficacious and well borne only in true inflammatory rheumatism, but is of no avail in the so-called "infectious pseudo-articular rheumatism," either septicæmic or gonorrhœal.

Alex. Robertson, of Glasgow,²¹³ reported a case of hyperpyrexia in acute rheumatism, which was treated successfully by cold baths. M. J. Palardy, of St. Hugues, Can.,¹²² recommends

the judicious resort to venesection in the more severe cases of acute articular rheumatism. W. H. Flint, of New York, ^{July}₁₈₇₀ strongly recommends salophen in acute rheumatism, in doses of 1 gramme (15 grains) every three hours, in conjunction with sodium bicarbonate, 6 decigrammes (10 grains), three times a day, and illustrates the same by a record of six cases.

Chronic Rheumatism.—S. P. Smirnoff, of Cronstadt, and T. T. Hermann, ^{Mar.}₁₈₇₀ report very favorable results from the use of the *Vaccinium vitis idæa*, or red bilberry, in the treatment of protracted cases of severe chronic articular rheumatism. The remedy has been long used freely in such cases by the peasantry of Russia. Smirnoff reports nine cases treated by him for a period of from one week to three months, with several recoveries and two failures. He gave it in the form of a decoction prepared from the fresh stems, leaves, and roots. F. I. Tchüteff, of Kuersk, ^{Apr.}₁₈₆₉ is reported by V. Idelson as having used the same remedy with equal success. The remedy appears to produce both a diuretic and diaphoretic effect, but not sufficient to explain the curative results obtained. L. P. Walbridge, of Decatur, Ill., ^{May}₁₈₇₀ decidedly recommends mechanical treatment in such cases of chronic rheumatism as are accompanied by swelling, stiffness, adhesions, contractions of the muscles, and more or less pain in the joints, especially on attempting motion. He commences by stroking and kneading the parts in a centripetal direction, to increase the lymph and blood currents out of the parts, and after a few daily repetitions he forcibly breaks up the adhesions and secures permanent mobility by daily passive movements, until free, active motion is restored. He briefly relates five cases illustrative of his method of treatment.

Gonorrhœal Rheumatism.—Lucien Arnaud, interne in the service of L. Jullien, at Saint-Lazare, ^{Mar.}₁₈₇₀ reports an interesting case of well-developed gonorrhœal rheumatism, treated successfully by hypodermatic injections of the bichloride of mercury. W. B. Rogers, of Memphis, Tenn., ^{Apr.}₁₈₄₉ reports a case of gonorrhœal arthritis of the right carpal joint, treated by immersion of the part in hot water for thirty minutes each night and morning and supporting it at rest on a splint during the intervals, and giving internally 20 grains (1.3 grammes) of iodide of potassium, with $\frac{1}{8}$ grain (0.004 gramme) of bichloride of mercury, three times a day. A satisfactory cure was effected in five weeks.

Bernard E. Brodhurst, of Manchester, Eng.,⁹ says, in reference to the treatment of gonorrhœal rheumatism, that "when pain is first felt and swelling appears, the affected joints should be wrapped in lint covered with mercurial ointment, and they should be bandaged as firmly as can be easily borne, and the patient should be brought rapidly under the influence of mercury, preferably by inunction." He says under such treatment the pain and swelling quickly disappear, after which passive motion should be practiced to avoid the formation of adhesions and impaired mobility. When any articulations, whether large or small, have become stiff through neglect of the foregoing treatment in the early stage, he applies sufficient force to break the adhesions, and always *first* in the direction of flexion. In very old cases, in which the flexor muscles have become so contracted as to prevent extension, he cuts the tendon and completes the extension gradually. He alludes to cases of even long standing of fibrous ankylosis of the shoulder, elbow, hip, and knee, as well as of the smaller joints, treated successfully in the manner indicated. And he closes his paper with the following declaration: "Ten years ago I had operated on upwards of one thousand cases of fibrous ankylosis, and in no instance, either before that time or since, have I known of any accident, whether displacement, or fracture, or inflammation, or injury of whatever kind."

GOUT.

Etiology.—Edward Grün,⁶ claims to have found, in three cases of acute gout, "the blood swarming with a long, encapsuled bacillus, side by side with which were seen numerous crystals of biurate of soda." William Davis, of Omaha, Neb.,¹⁰⁶ directs attention to the frequent connection between gout and irritation of the mucous membranes, more especially as seen in hay fever and chronic nasal and pharyngeal inflammations.

Georges Lemoine and P. Joire, of De Lille,⁵⁵ discuss at considerable length the influence of lead in the production of gout. They think the diffusion of lead in the system interferes with dissimilation, or retrograde metabolism, and thereby favors the formation of the uric acid and urates of gout. ¹⁷⁶ contains an article on the relations of regimen to gout, in which the writer claims that the deleterious effects of alcoholic liquors in producing

gout depends very much upon the incompleteness of the process of fermentation by which they are produced. By such incompleteness a considerable percentage of sugar remains in the liquor, whether beer, wine, or cider, and when it is drunk it is liable to enter into further fermentation in the digestive organs of an acid character, and thereby favor the development of an attack of gout. It is not claimed that the sugar alone is injurious, but only when taken with the alcohol or some other article of diet that induces it to ferment in the digestive organs.

Pathology.—Sir William Roberts, in his Croonian Lectures before the Royal College of Physicians, London, June 18, 25; July 2 gives the results of an interesting and important investigation concerning the chemistry and therapeutics of uric acid, gravel, and gout. With Garrod, A. Haig, and others, he regards the accumulation of the biurate of sodium and its deposit in various tissues as the most characteristic feature of gout. He says: "The arthritic incidents of gout may be said, not improperly, to be simply incidents pertaining to the precipitation of these crystals in the structures of the joints." And he adds: "Were it possible for us to keep the sodium biurate in a state of solution in the bodily fluids, the clinical portraiture of gout would be completely transfigured." He then carefully determines the solubility of sodium biurate in water, blood-serum, synovia, and other fluids, and finds it very sparingly soluble, not more than one part in ten thousand of these fluids. A large number of experiments were next performed to test the solubility of sodium biurate in various saline solutions, particularly those of sodium, potassium, calcium, magnesium, and ammonium. Instead of increasing the solvent power of the menstruum kept at the temperature of the human body, the addition of any of these salts lessened such solvent power in a marked degree, except those of potassium, which appeared to exert no influence. It was further ascertained that the influence of the salts depended entirely on the nature of the base, and not on their acid or alkaline reaction. By another series of experiments, Sir William Roberts appears to show that where uric acid is added to blood-serum or synovia at the temperature of the body it enters into combination with the sodium carbonate, forming first a quadriurate, but subsequently it takes another atom of the base and becomes a biurate of less solubility, and hence precipitates in the

crystalline form. These changes are supposed to represent what actually takes place in an attack of gout. While the quantity of uric acid in the blood and synovial fluids remains small it is held in solution and eliminated as quadriurate; but when the proportion becomes excessive it changes to a biurate and soon precipitates, bringing with it active phenomena of gout.

J. Vindevogel, of Brussels,²⁰⁵⁴ after referring to the chemical doctrines of Garrod, Sir William Roberts, and others, claims, as an essential part of the pathology of gout, an enfeeblement or lessened activity of the trophic nervous centres, and a loss of equilibrium between the processes of assimilation and disassimilation, by which the products of disintegration are rendered incomplete or toxic to the economy.

Mabboux, of Paris, and Baudon, of Nice,¹⁵⁴ both attribute certain uterine and ovarian affections to gout; and J. Gordon Black, of Harrogate,²⁹ attributes to this source some cases of cerebral apoplexy.

Treatment.—The important therapeutic inferences from the recent investigations of Sir William Roberts, previously referred to, are: the adherence to such habits of life, including exercise, diet, and clothing, as will keep the proportion of uric acid formed in the system small; and, when it is produced in excess, the use of such remedies as will retain its solubility and promote its elimination, of which the alkaline potassium salts and piperazin are the most efficient. Nothnagel, of Vienna,⁵⁷ in a clinical lecture, recommends for gouty patients a diet of fresh vegetables and fruits, with meat sparingly, and the exclusion of sugars and starches. To remove the diathesis he recommends active physical exercise, alkaline baths followed by friction, and the use of lithium salts well diluted. Schweningen, of Germany,⁶¹ highly recommends the use of piperazin, in the treatment of both acute and chronic gout, as the most efficient solvent of uric acid and urates. It may be given to the extent of 1 gramme (15 grains) per day, largely diluted with water, and continued safely for a considerable time. A. D. Rockwell, of New York,¹ relates a case of "hereditary nervous gout," much benefited by general faradization.

DISEASES OF THE BLOOD AND SPLEEN.

By FREDERICK P. HENRY, M.D.,

AND

ALFRED STENGEL, M.D.,

PHILADELPHIA.

BLOOD.

Rosin⁸¹⁹_{Apr. 30},⁸⁴⁴_{June 18},²_{July 2} and Niebergall²¹⁴_{Feb. 15} testify to the value of the hæmatokrit (See ANNUAL, 1892, vol. ii, E-1) in estimations of the globular richness of the blood, and the latter, especially, furnishes interesting investigations of its value compared with the method of counting by the Thoma-Zeiss cytometer. In twenty-six cases he found an average variation of but 75,000 red corpuscles in the readings of the two tubes of the instrument, whereas the variation in the separate counts of the same blood by the Thoma-Zeiss apparatus is from 200,000 to 300,000. The further advantages of the instrument, he says, are the ease of operation, the rapidity with which the estimation is made, and the fact that the two tubes give a sort of control by which the accuracy of the result may be gauged. He does not think the centrifugal method is reliable for white blood-corpuscles. Dehio⁴¹_{May 6} finds a constant fallacy in the result obtained by the hæmoglobinometer of Fleischl, and that this error grows greater as the hæmoglobin decreases in quantity. Hammer-schlag²²_{July 1} details his method of estimating the specific gravity of the blood and his results in certain cases of hydræmia. He found that, while the serum is usually of less specific gravity in anæmia than in health, this is not always so. In cardiac disease the same is true.

Hock and Schlesinger⁹²⁶_{N.F., II} have studied the blood of infants, especially as regards the specific gravity and the characters of the corpuscles. The specific weight of the blood they found to depend not so much upon the number of corpuscles as upon the richness in hæmoglobin; and, though varying more widely in different cases

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than in adults, remains constant in a given case for some length of time.

Sadler, of Prague, ⁵⁴_{Feb. 10}, ⁵⁶⁸_{Mar. 20}, ⁶_{Mar. 1}, studying the blood of anæmia secondary to various forms of disease, found a constant slight diminution in the number of red corpuscles after acute disease, but a great reduction, with corresponding lessening of the hæmoglobin, from chronic diseases. The last statement we are convinced will prove erroneous on further examination, since in a large number of studies we have found a more or less pronounced chlorotic condition of blood in chronic diseases. In diarrhœa Sadler found an increased quantity of corpuscles and hæmoglobin; he saw leucocytosis in exudative diseases, like pneumonia and serous inflammations, and in sarcoma, but not in cancer, unless there was secondary suppuration.

Kiefer, of Ann Arbor, Mich., ⁹_{Feb. 27} found experimentally that the arterial blood and venous blood are practically identical in corpuscular richness and quantity of hæmoglobin, unless congestion be produced in obtaining the blood, when the corpuscles become augmented,—in his experiments 537,000 per cubic millimetre on the average. In the blood after hæmorrhage he found an almost equal diminution in red blood-corpuscles and hæmoglobin, but in the subsequent reconstruction the corpuscles regained the normal much sooner than the hæmoglobin.

Vaquez ³_{Nov. 11} calls attention to the rarity of polycythæmia, to its physiological occurrence at high altitudes, and, pathologically, after profuse serous discharges, and then reports a case of apparently primary polycythæmia in which the corpuscles numbered from 7,500,000 to 9,130,000, with corresponding increase of hæmoglobin and specific gravity of 1081. Clinically, there were dilated veins, cyanosis, vertiginous attacks simulating Menières disease, but without ear disease, and, finally, enlargement of the spleen. Cyanopathy was excluded by absence of any lesion of the heart. The case was under treatment for two years. The effect of venous engorgement on the condition of the blood might well have been considered in this case.

Regnard, ³_{June 1} proved experimentally that the blood of an animal placed under conditions of great atmospheric pressure becomes augmented in the proportion of hæmoglobin and, therefore, in its efficiency to further respiration.

E. A. Wright, of Edinburgh, has contributed several important papers on the question of coagulation of the blood, and has suggested some practical deductions. In a first paper ²_{Dec.5,91} he confirms the statement of Arthus and Pagés, that coagulation may be prevented by precipitation of the calcium salts with oxalates; and demonstrated experimentally, in dogs, that this fact could be turned to practical use in transfusion, the danger of clotting, which may occur in ordinary transfusion, being thereby prevented. In a subsequent paper, ⁶_{Feb.27, Mar.5} he details his investigations of the nature of tissue-fibrinogen. After reconciling the views of Wooldridge and Groth, by showing that both obtained the same substance in their experiments,—the one by using the leucocytes themselves, and the other by washing them,—he further concludes that tissue-fibrinogen injected into the blood causes first increased, then diminished coagulability, the latter occurring as a result of the splitting of the fibrinogen into albumose, uric acid, and other substances. Wright ²_{Dec.19,91} further suggests the use of calcium salts to increase the coagulability of the blood in cases of hæmorrhage or hæmorrhagic diseases, and has prepared an external styptic by adding calcium salts to solution of fibrin ferment.

Lilienfeld ⁶⁹_{July 14} ascribes to the nucleus of the leucocytes and to the blood-plaques the principal rôle in coagulation, and says that this may be seen in histological preparations in which fibrin threads are seen to pass from masses of plaques to the nuclei, which either move to the side of the leucocyte, or even leave it entirely. He has isolated a substance which he calls *leukonuclein*, and which he regards as the chemical agent necessary to coagulation.

Krüger, of Dorpat, ²¹_{May 23} examined the blood of a case of severe anæmia following hæmorrhage and one of leukæmia, by the method of Alex. Schmidt, and found that in the former the solid matter was reduced by diminution of the quantity of the corpuscles as well as serum, whereas in the latter the serum was richer than normal in solid matter, the corpuscles, however, being much reduced. Lépine and Barral, of Lyons, ²¹¹_{May 29} have repeated the experiments of Arthus to determine the existence of a glycolytic ferment in the blood, and conclude that the failure of Arthus to find such was due to the fact that he permitted the corpuscles which (according to them) contain the ferment to settle to the bottom and remain there.

The alkalinity of the blood, according to Drouin,¹⁶⁴ is decreased in fevers, anæmia, scurvy, diabetes, and many other conditions, but constantly increased in chlorosis.

Gürber,⁸¹ opposes the view of Schwartz, that the protoplasm of the spleen has the power of first destroying and then restoring the hæmoglobin of blood, and maintains that Schwartz's results were due to a mechanical precipitation of the coloring matter by the splenic cells. The color returns later as a result of decomposition of the cells with the freeing of the incarcerated methæmoglobin.

Maragliano, of Genoa,⁶ urges that the plasma, as well as the corpuscles, may be the seat of disease processes, and points out that the plasma of blood from cases of infectious diseases has a globulicidal action, whereas healthy plasma produces no such effect. Maragliano,^{4, 222} further holds that the corpuscles have the same physiological and pathological independence as other cells. He was able to show progressive necrobiotic and, finally, destructive processes in them, and to trace these to the action of the serum. Destructive action of serum is in part due to lack of sodium chloride.

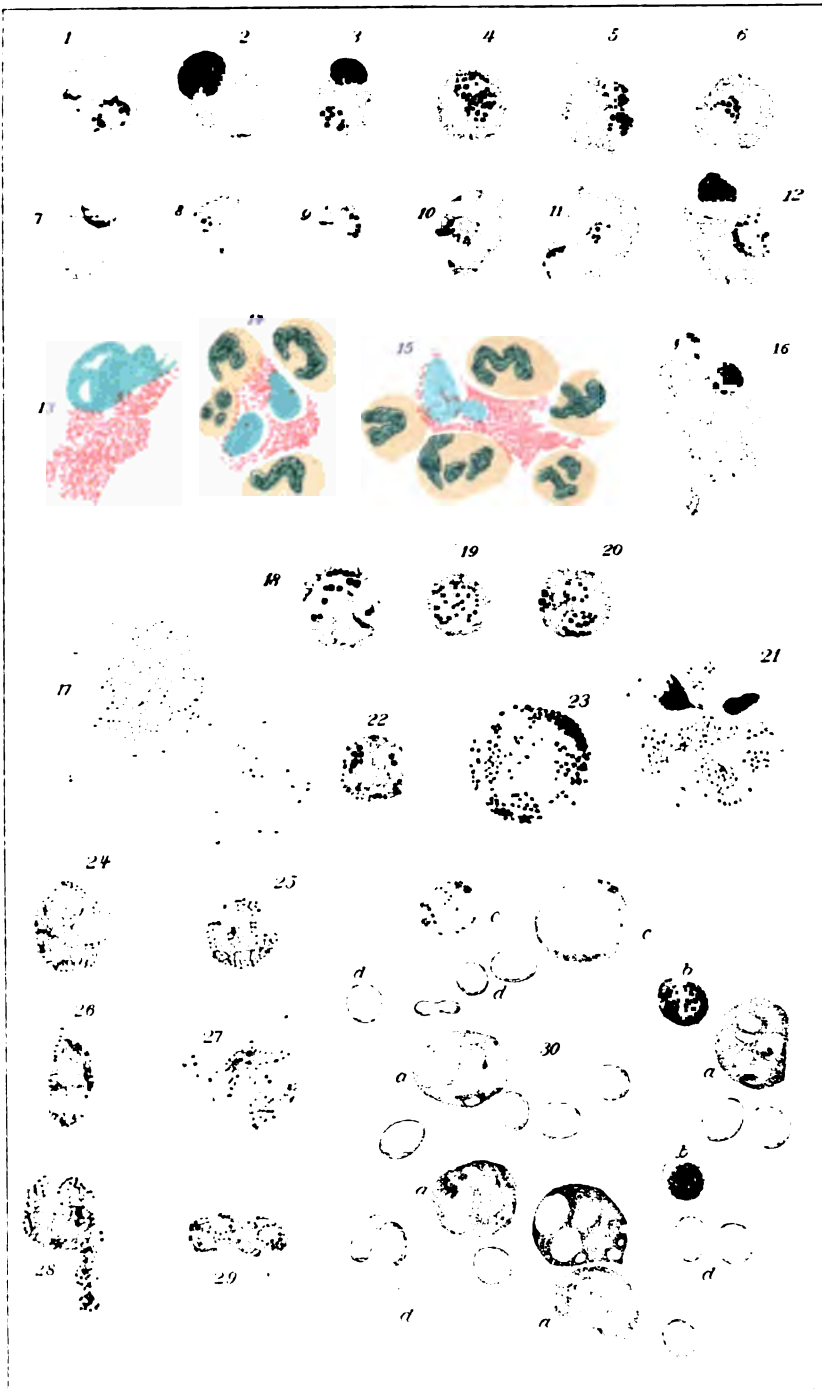
Foxwell, of Birmingham,³² in his Ingleby Lectures, treats of the condition of the vascular system in anæmia, but incidentally remarks that it is not impossible that the differences which we seek to establish between the different forms of anæmia may be largely artificial, while in reality the various blood diseases may be closely related.

Wilcox, of New York,¹ found that, of the various anæmic murmurs, that at the apex was the first to disappear with improvement of the blood; later, that in the second left intercostal space; and finally, with approach of a normal condition, the bruits in the neck. He lauds very highly a solution of chloride of iron in syrup as being as efficacious as the tincture, and less destructive to the teeth.

Luigi d'Amore, of Naples,⁵⁷ found, in treating four cases of syphilis with mercury, a constant improvement in the richness of the blood, and protests against the view of some that mercury has an opposite effect. In health and in large doses in syphilis a deterioration does result from the use of mercury.

Hock and Schlesinger,⁹²⁶ examined the blood of young





The Granulations of the White Blood Corpuscles.

Centralblatt für allgemeine Pathol und path Anatomie.

children and found: (1) a notable percentage of eosinophiles; (2) a small number of leucocytes showing mitosis in the newborn and during the first few months; and (3) nucleated red corpuscles (normoblasts) during the same period. These results coincide with those of Luzet, which were noted in last year's ANNUAL (vol. ii, E-9). Troje, of Berlin, ⁶⁹Apr. 21, ²²Mar. 22 regards the varied character of the leucocytes as of the greatest importance in distinguishing between leucocytosis and leukæmia. The myelocyte of Ehrlich may be a valuable diagnostic feature, but one which is frequently wanting. Weiss ²²May 22 likewise regards the polymorphism of the leucocytes as significant of leukæmia, though it may happen that in pure lymphatic leukæmia, as usually in leucocytosis, the white cells are mostly mononuclear.

Neusser, of Vienna, ⁸Jan. 21 et seq.; ⁵⁷Jan. 24; ⁴¹Mar. 2 disclaim any diagnostic significance for the eosinophile cells in leukæmia, as they have both found such abundantly in the blood, in excretions, and purulent collections in various disease conditions. Neusser was led, by the abundance of eosinophiles in pellagra of the dermal, as well as of the cerebro-spinal and gastro-enteric types, and in ovarian diseases, to ascribe a nervous element as playing some part in the production of these cells, and thinks that this fact may be turned to advantage in prognosis.

Janowski, of Warsaw, ⁸⁵⁴June 16 contributes a paper on the granulations of white corpuscles, especially the eosinophilous. He found these abundant in the pus of gonorrhœa in its early stages, as have others before him, and contrary to the statement of Ehrlich, who found the leucocytes of gonorrhœal pus entirely neutrophilic. Janowski further compares the results obtained by the Ehrlich method of staining and that of Altmann, and finds that the latter brings out the eosinophilous granules, and not the neutrophilic, just as does Ehrlich's method. An excellent illustration representing the different forms of leucocytes and different kinds of granules accompanies the paper.

Explanation of Plate.—All drawings were made as seen with the semi-apochromatic oil-immersion of Reichert, $\frac{1}{2}$ inch and oc. No. 4. Figs. 1-23.—Eosinophilous cells of blood or pus stained with eosin and methyl-blue. Figs. 24-29.—Eosinophilous cells of blood and pus stained by Altmann's method. Fig. 30.—Blood of a case of leukæmia: (a) neutrophilic cells; (b) small lymphocytes; (c) large lymphocytes; (d) red blood-corpuscles.

Zappert, of Vienna, ⁵⁷_{Nov. 11}, suggests a method for counting the eosinophile cells in fresh blood. The blood is mixed in a Thoma-Zeiss apparatus with a solution consisting of 2 parts of a 1-per-cent. osmic-acid solution and 1 part of a solution composed of 25 parts each of glycerin and water and 100 parts of 1-per-cent. aqueous solution of eosin. The blood is mingled with the solution and allowed to remain for two minutes, when the eosinophile cells become dark-red, the neutrophiles pink, and the red corpuscles somewhat stained and shrunken. He found from $1\frac{1}{2}$ to $4\frac{1}{2}$ per cent. of all the leucocytes in health eosinophilous, and in leukæmia from 2 to 6 per cent.; never more. This estimate is certainly very low, and we recall cases in which there were over 10 per cent., and others presenting as many as 30 per cent. are recorded.

CHLOROSIS.

Williams, of Liverpool, ¹⁸⁷_{Jan.} urges that tight-lacing plays an important part in the causation of chlorosis, as well as gastric ulcer, by interfering with proper abdominal circulation. This influence, he says, would be most pronounced at the period of rapid development of the body, at which time we know these diseases are common.

Peinado, of Granada, ³⁷⁷_{Jan. 15}; ⁶⁰⁶_{Mar. 10}; ¹⁹_{June 4}, observed the case of a woman who, forty days after confinement, began to menstruate, had gastric disturbance, and fever, at first intermittent, then remitting, and finally continuous. Tuberculosis was at first suspected, but, all signs being absent, the diagnosis was not made. Finally, by exclusion, the case was put down as febrile chlorosis, and on treatment with calomel (this being preferred to iron, from the condition of the stomach) the patient soon recovered. Villard, of Marseilles, ⁴⁶_{Nov. 16} and Didier ²⁰³_{Sept. 1} each report a case of double phlegmasia alba dolens in chlorosis. In Villard's case micrococci were found in the blood, to which he ascribes the thrombosis; and in Didier's the complication could be clearly traced to suppuration of a toe from cutting a corn. Bourdillon, of Montpellier, ²¹²_{Sept. 10} states that thrombi may form in the cerebral sinuses and cervical veins, though usually they occur in the femoral vein. Cerebral thrombi necessarily cause death; the two recorded instances of thrombi in the jugular vein ended in recovery. He regards infection as the cause.

Brunon ²⁰³_{Aug. 16} very properly insists upon hygiene as the most im-

portant part of our treatment. Nothnagel^{113 169}_{No. 62; Mar.} advises, in the treatment of chlorosis, such mild laxatives as compound licorice-powder and cream of tartar. The preparation of iron used will depend upon individual conditions. Blaud's pill and the tincture of the chloride of iron are preferred. Arsenic ought not to be used alone, but forms a good adjuvant, especially in the form of arsenical waters, like the Roncegno or Leviso. Sulphur, so highly lauded by Schultz, acts probably by stimulating the bowels.

Schultz,^{4 15 80}_{Mar. 76; June; July 15} in reply to Nothnagel, claims that sulphur bears very intimate relations to cellular protoplasm, and acts in a more important manner in chlorosis than as a mere laxative. It is indicated when iron does not seem to act and when there is not gastro-intestinal irritation. After it has been used for a time, iron may again be administered instead, and with better hope of success than before the sulphur was used. Goodhart, of London,^{5 12}_{June; Aug.} writing on the treatment of chlorosis, denies most positively the alleged specific value of laxatives, and, though he uses such in all cases, a cure must depend upon the administration of iron. Dialyzed iron, he says, is useless; the sulphate is emetic in such doses as are required. The saccharated carbonate and reduced iron, however, are efficient when given in large doses,—30 grains (2 grammes),—three times daily, and continued for six weeks at least.

Rochford, of Newport, Ky.,¹_{July 20} also insists upon the necessity of keeping up treatment until the hæmoglobin has neared the normal, and calls attention to the value of the hæmoglobinometer in indicating deficiency, even after the patient looks and feels entirely restored. There can be no question as to the importance of this matter, and with treatment prolonged until complete restoration of hæmoglobin relapses would be much less frequent.

Pick, of Vienna,^{8 6 112}_{Dec. 10, '91; Feb. 20; Mar.} advises, in chlorosis with gastric disturbances, that the stomach be washed out at stated intervals. He reports sixteen cases treated in this way, all with excellent results, and five of the number had been given iron for a month, at least, without effect. The aseptic condition of the stomach may also be attained by administering such drugs as hydrochloric acid, creasote, and β -naphthol, but not so readily as by lavage.

Schubert^{41 169}_{May 26; Aug. Sept.} again insists upon the value of blood-letting in chlorosis, and warns against the hasty condemnation of the

method if improvement is not seen at once. To emphasize this point, he reports several examples in which improvement did not occur promptly or at all, and two cases of extreme anæmia in which death followed venesection,—in eight weeks in one case and in a few days in the second. Very curiously, he maintains that the deaths in these cases could in no sense be attributed to the blood-letting, although in the second case the woman never recovered from the immediate depression of the venesection. It would be to the point to place this fact beside his statement, previously made, that he has never seen a bad result follow venesection in chlorosis, and it would be pertinent to ask what constitutes a bad result.

Whatever our conclusions be regarding the advisability of bleeding in chlorosis, and whether or not we conclude that there is an actual plethora from overdistension of congenitally narrow vessels, and therefore that bleeding would or would not meet a distinct indication, no one will urge such reasons in ordinary anæmias; and the further report of Schubert, of five cases of simple anæmia and three of headache treated by venesection, must seem a reversion to the old style of indiscriminate bleeding in all sorts and conditions of disease.

Chéron⁶ _{Nov. 1} advises scarification of the os uteri, the habitual congestion of which makes it easy to withdraw 40 to 60 grammes (10 to 15 drachms) at each operation. It is advised to abstract a gramme (15½ grains) per kilogramme (2½ pounds) of body-weight. Whatever the advantages of this treatment, it will be one to which recourse can rarely be had, from the fact that the necessary exposure will be objectionable, especially as young girls are so often the subjects.

Burton-Fanning and Williams⁶ _{Nov. 28, '91} report a case of chlorosis, complicated by influenza and pleurisy, in which the patient sank into a condition evidently bordering on dissolution. At this point transfusion of blood was performed with Galabin's apparatus; the patient at once reacted, and subsequently improved steadily, in the general condition, as well as in the quality of the blood.

PERNICIOUS ANÆMIA.

Péter¹⁴ _{Jan. 28} reports an interesting case from his service in the Hôpital Necker, the patient being a groom 30 years old. The

red corpuscles, when first counted, numbered 660,300 per cubic millimetre; and the white, 5890. Six weeks later the former had almost quintupled, *i.e.*, they numbered 3,069,000, while the white remained at about the same figure, 4960. The general symptoms showed a corresponding improvement, fever, formerly decided, disappearing, and the pulse descending from 120 to 76. The case seems to be a genuine one of pernicious anæmia, and the apparent recovery was brought about by arsenic given hypodermatically and by the mouth. The diet consisted largely of kefir, 2 litres (2 quarts) of this substance being consumed daily. In this communication Péter coins the word *cachæmia*, which is most expressive of the state of the blood in pernicious anæmia.

A. Pineau¹⁵²_{Mar.11} reports, to the Clinical Society of Paris, a case of pernicious anæmia, with autopsy. The patient was a female 50 years old, by occupation a dress-maker, whose family history was good and who had enjoyed good health up to within a month of her admission to the Saint Antoine Hospital, on September 28, 1891. She died on October 30th, and at the autopsy no material lesion was found in any of the organs, except such as might be regarded as secondary to the state of the blood, unless the state of the marrow be excepted. This tissue, as is so often the case in pernicious anæmia, had returned to the fœtal condition. The urine was dark-colored, and gave the spectrum of hæmoglobin. The red corpuscles were greatly reduced, the highest of several counts being 806,000 per cubic millimetre; the white cells and the hæmatoblasts were both reduced in number, while the percentage of hæmoglobin was increased, amounting on one occasion to 1.30. The reporter omitted to examine the tissues, especially the liver, for iron, a point insisted upon by W. Hunter. Pineau discusses in an able manner the various theories of the disease, and decides it to be due to defective hæmogenesis. T. N. Kelynack and F. J. H. Coutts⁹⁰_{Sept.} report a well-studied case, with autopsy, and give brief notes of two other cases which are still under observation. The fatal case was a married female, aged 44 years, who died a week after admission to the Royal Infirmary of Manchester. The red corpuscles numbered 450,000 (9 per cent.), while the percentage of coloring matter was 15. There were retinal hæmorrhages in both eyes. The usual fatty changes consecutive to pernicious anæmia were found post-mortem, but noth-

ing that could be regarded as causative of the anæmia. Iron reaction was well marked in liver and kidneys, but was absent in spleen; in the first-mentioned organ the amount of iron was found by quantitative analysis to be five times greater than normal. It is not stated whether the woman was a multipara, and, if so, whether the disease could be attributed to rapidly successive pregnancies,—a recognized cause of the disease in the female sex.

A discussion on grave anæmic states was held at the Eleventh Congress for Internal Medicine, ⁸ _{Apr. 22} Birch-Hirschfeld being referee and Ehrlich co-referee. The former argues that pernicious anæmia has no uniform pathogenesis, but may be associated etiologically with losses of blood, gastro-intestinal disorders, intestinal parasites, the puerperal state, and infectious diseases, such as syphilis and malaria. The so-called idiopathic or "cryptogenetic" varieties are probably due to the destruction of the red corpuscles by poisonous substances, toxins, or enzymes formed within the body itself, or introduced into it from without. [This view of the diverse origin of pernicious anæmia appears to the writer to be in accord with universal clinical experience.—Ed.]

Ehrlich's remarks, as co-referee, are limited to the morphology of the blood-corpuscles which, in pernicious anæmia, show the signs both of degeneration and regeneration. The former are threefold, and include: (1) the well-known poikilocytes, first described by Ehrlich himself; (2) a species of degeneration closely resembling coagulation necrosis; (3) an alteration of the corpuscles, characterized by the appearance in their interior of one or two corpuscles composed of modified hæmoglobin. The latter process is called by Ehrlich hæmoglobinic degeneration,—"*dégénération hémoglobinique*." The process of regeneration is manifested by the presence of nucleated red corpuscles, which are divided by Ehrlich into two varieties: the normoblasts and the megaloblasts; the former corresponding to the hæmatinic evolution of adults, the latter to that of the embryo. The nucleus of the normoblast is extruded to form a new red corpuscle, while the nucleus of the megaloblast is absorbed. Other participants in this interesting discussion were Troje, Fürbringer, Klebs, and Litten. Klebs believes in the infectious origin of a certain number of the cases of pernicious anæmia, and refers to one in which the blood contained enormous numbers of flagellate bodies. Consider-

ing the eminence of those who participated in this discussion, and their identification with the subject, it must be regarded as the most important contribution of the year to the literature of pernicious anæmia.

Escherich, of Graz, ⁸_{Nov. 13, 14} reports a case of pernicious anæmia in a boy 4 years and 2 months old. The disease lasted over five months and the red corpuscles sank to 575,000 per cubic millimetre. The white numbered 7000, making a proportion between white and red of 1 to 82. The percentage of hæmoglobin varied between 10 and 15. There was no enlargement of the spleen or organic disease of any kind. Transfusion of defibrinated blood was performed, the blood being injected into the radial artery of the left hand. There was transient improvement after the operation, but vomiting and other signs of digestive disorder set in and the patient gradually succumbed. Escherich's report contains an interesting *résumé* of the literature of pernicious anæmia, in the course of which he remarks that the disease has been observed but ten times in children.

Eisenlohr, of Hamburg, ⁹_{Apr. 2} reports a case of pernicious anæmia, the patient being a man, 60 years of age, who, in addition to the usual signs and symptoms of the disease, had spastic-paretic gait and incontinence of urine and fæces. Although no special derangement of digestion had been complained of during life, there was found at the autopsy a high degree of atrophy of the glandular structure of the stomach and intestines. The paralytic symptoms were accounted for by degeneration of the posterior columns of the spinal cord. Whenever practicable, at the autopsies of cases of pernicious anæmia, the spinal cord should be examined. As stated in the ANNUAL for 1890 (vol. ii, E-10), the symptoms of paralysis are often masked by others dependent upon the profound anæmia; so that the former may readily be overlooked.

Elizabeth Sargent ²_{Aug. 27} and Alexciëff ¹⁵²_{Mar. 18} reported the results of studies of the ocular changes in cases of so-called pernicious anæmia, but, as there is no account of an examination of the blood in either case, the diagnosis is open to question. The case of Alexciëff is described as having the skin covered with petechiæ, a fact which makes the diagnosis of morbus maculosus Werlhoffii quite as probable a one as that of pernicious anæmia. [It cannot be too strongly insisted upon that authors, before giving names to the

cases which they report, should make an accurate diagnosis. In pernicious anæmia the blood-changes are so characteristic as to be unmistakable, and apart from them there is nothing to distinguish the affection with certainty from many other profound cachectic conditions.—ED.]

J. M. Anders and H. W. Cattell, of Philadelphia,²²² report a case of so-called pernicious anæmia in which a "hæmorrhagic tumor of the pituitary body and infundibulum" was found at the autopsy. [So far as the diagnosis of pernicious anæmia is concerned, this case is also open to criticism, inasmuch as there is no account of an examination of the blood. The clinical course of the case also differs in some important respects from that of pernicious anæmia. For example, the temperature was recorded on but two occasions, and each time it was subnormal.—ED.] Leonard S. Taylor, of Chicago,¹⁹² enumerates the symptoms of pernicious anæmia as given in all text-books on medicine, but reports no cases.

Graham, of Toronto,³⁹ exhibited to the Pathological Society of that city a specimen of fatty heart from a case of pernicious anæmia. There was incompetence of the mitral valve from dilatation of the left ventricle, but no narrowing or thickening of the valves. Nevertheless, there is said to have been a mitral systolic, together with a diastolic and presystolic, murmur. The presence of the latter in the absence of mitral stenosis is certainly a remarkable circumstance.

Treatment.—At a meeting of the Medico-Chirurgical Society of Edinburgh, Brakenridge,⁶ reported 5 cases of pernicious anæmia which he had treated by transfusion of blood, the operation being performed in each instance by John Duncan. The results were most encouraging. In 3 cases marked improvement followed each transfusion, and in "some" of the cases the red cells had risen to the normal number and the patients were practically well. In 1 case acute miliary tuberculosis developed immediately after the operation, and the patient died in the course of three weeks. The number of transfusions varied from 1 to 4, and the quantity of blood transfused from 2 to 6 ounces (60 to 180 grammes). The transfused blood was mingled with a solution of phosphate of sodium to prevent coagulation. At the same meeting, Affleck reported a case in which the red cells were reduced to 500,000 per cubic millimetre and the hæmoglobin to less than 20 per cent., in

which, after a single transfusion, the number of corpuscles had risen to the normal in the course of a few weeks, and the man seemed perfectly well. In the course of the discussion, Duncan explained the manner in which he performed the operation.

H. A. Hare⁸⁰ has treated a "number of cases" of anæmia and debility with arsenite of copper, and "with very encouraging results." There appears to have been no case of pernicious anæmia in the series, but, on theoretical grounds, this salt would probably be of service in that disease. The dose is from $\frac{1}{50}$ to $\frac{1}{25}$ grain (0.0013 to 0.0025 gramme) after meals.

G. A. Gibson, of Edinburgh,²_{July 18} has treated a case of questionable pernicious anæmia with β -naphthol, and with marked success. The characters of the blood were identical with those of pernicious anæmia, the red corpuscles being reduced to 800,000, megalocytes, microcytes, and poikilocytes being also present. The patient, however, had a stone in the right kidney, and had suffered from paroxysmal hæmoglobinuria.

LEUKÆMIA.

Pawłowski, of Kiew,⁶⁰_{July 7},²_{Aug. 18} describes a bacillus which he has found in the blood and tissues, especially the lymphatics and blood-paths of the liver, in three cases of leukæmia. The bacillus is marked by the existence of a spore in its centre, and, after some failures, was successfully cultivated. Pawłowski concludes that leukæmia is the reaction of the leucocytes of the blood-forming organs, and, to a less extent, of the blood itself, to the irritant bacillus. [These observations, however, like similar ones before, cannot be regarded as conclusive, though unquestionably general opinion inclines more and more to the belief in a microbic cause. This is especially true of the interesting cases of acute leukæmia reported from time to time. Three such have been recorded during the year.—Ed.] Litten⁸⁴_{Apr. 28} reports a case following influenza, and which terminated in three days; and Guttmann⁴_{Nov. 28, '91} another, in a child of 10 years, in which, after a few days of malaise, hæmaturia, purpura, epistaxis, enlargement of the spleen, and, finally, hemiplegia rapidly ensued, and led to a fatal termination in four and a half days. The ratio of white to red corpuscles was 1 to $1\frac{1}{4}$. At autopsy the spleen and thymus were enlarged and various purpuric lesions were discovered.

Grewe,⁴ reports a case of acute leukæmia, in which, after a strain in lifting a weight, the patient, a man of 28 years, had hæmorrhages from the mouth and under the skin. A day or two later there was moderate enlargement of the spleen and liver, and the blood presented the characters of lymphatic leukæmia. Death occurred after eleven days. At autopsy the lymph-glands were enlarged in all parts of the body, the spleen was hypertrophied, and the liver and kidneys contained lymphoid nodules. There was an indistinct history of purpuric manifestations for some months prior to the attack, and Grewe concludes that there was in this case, as in other similar ones reported, a latent period before the acute attack. These cases, with Litten's, and with fifteen collected by Ebstein and one each previously reported by Westphal and Senator, make twenty such instances of acute leukæmia recorded in literature. It is manifestly difficult in these cases to escape at least the suspicion of infection.

Palma,¹⁰ reports, from the clinic of v. Jaksch, at Prague, a case of primary sarcoma of the thymus, with secondary deposits in the lymph-glands, spleen, and liver, which at first presented the characters of pseudoleukæmia in its general features and in the condition of the blood. A month later leucocytosis (1 to 7), with increased proportion of eosinophiles, occurred, and the case was regarded as one of pseudoleukæmia terminating in leukæmia. The number of leucocytes was far too great to ascribe to the sarcomatosis alone.

Monro, of Glasgow,²¹³ details a case of leukæmia, in which there were found, on histological investigation, numerous small, oval bodies situated in the interstitial substance of the heart-walls, and whose nature remains obscure. They were smaller than nuclei of leucocytes (though their staining with hæmatoxylin was like that of nuclei) and too irregular in shape and size to be regarded as bacteria. They were found only in the heart.

Oliver, of Newcastle-upon-Tyne,⁵ records a case of leukæmia, in a girl of 19 years, in which death occurred from hæmorrhage into the retroperitoneal space, a blood-tumor as big as a man's head being found post-mortem. Great enlargement of both spleen and liver and continuous deafness were other features of the case. Gwynne, of Sheffield,² reports a case of leukæmia, in which emaciation, with gastric disturbances and hæmaturia, were the prominent

symptoms. Englehardt, of Riga, ²¹_{May}, records a case in which there was an attack of hæmoglobinæmia, hæmoglobinuria, and icterus, with fever and gastric disorders. The patient slowly recovered, but, after several months, succumbed in a second attack. Englehardt maintains that there is, as a rule, a certain degree of hæmoglobinæmia, but rarely of sufficient extent to cause visible symptoms.

A case of Troje's, of Berlin, ⁶⁹_{Apr. 31}; ²²_{Mar. 23} a girl of 17 years, first came under observation with the symptoms of Werlhof's disease, enlarged glands and spleen, and the diagnosis of pseudoleukæmia was made. She first recovered, but soon sickened again, and then presented leucocytosis and undoubted leukæmia, and finally died. The autopsy revealed, in addition to the glandular enlargements, peculiar cheesy nodules in the mucosa of the stomach and intestines. The author thinks this case one of repeated infection, the first attack being an aleukæmic, preparatory stage of a subsequent leukæmia.

Hansemann, of Berlin, ⁶⁹_{Mar. 21} and Eichhorst, of Zurich, ²¹⁴_{Mar. 1} report cases of pure lienal leukæmia, and the latter calls attention to the rarity of leukæmia in Switzerland, there having been but 3 cases among 15,000 patients treated at his clinic during the last eight years. Weber ²¹_{Feb. 12}, ²_{Mar. 12} analyzed 28 cases of leukæmia, finding 12 in which the blood was of Virchow's lienal type, 4 of lymphatic, and 12 of mixed type. The spleen was enlarged in all, the liver considerably so in 10, and in 10 there was polyadenitis. In 4 the mesenteric glands only were enlarged, in 4 the cervical and thymus, in 2 the mammary, and in 2 the axillary glands. In the last 4 suppuration occurred. Four cases occurred in the first year of life and 3 in the seventh decade.

Lannois, of Lyons ²¹¹_{Jun. 3} records a case of leukæmia in which sudden vertiginous attacks, simulating Ménière's disease, occurred. Subsequent anatomical examination disclosed a fibrinous collection in the utricle and saccule of the vestibule, with here and there more decided evidences of hæmorrhage.

Drew and Bradford, of London ²_{June 4}; Campbell, of Saddleworth, and others record the excellent results obtained by treatment of leukæmia with arsenic in large doses. In the case of Campbell the spleen decreased with great rapidity (an inch all round in a fortnight), the liver less markedly, and in seven months the patient was plump and healthy to all appearances.

V. Jaksch, of Prague ⁸³_{Dec. 21, 71} investigated the blood and organs of leukæmia and other conditions for peptone by the methods of Hoffmeister and of Devoto. In the organs the former method shows peptone where none can be found by the latter; but in the exudates, transudates, and urine either may be used. The quantity of peptone in the blood in leukæmia varies widely,—from none, or traces, to large amounts; but, with disintegration of the blood, the peptone increases markedly. The liver and spleen contain notable quantities, but this is true also of the healthy spleen.

PSEUDOLEUKÆMIA.

In this disease, as in leukæmia, there is a disposition on the part of recent authors to regard micro-organisms as the specific cause, though none have as yet been isolated. The etiology of the disease must, therefore, remain obscure, as well as the relations of the disease to pseudoleukæmia, though the close connection cannot be questioned. Palma, ⁸⁶_{Sept. 1} Troje, ⁸⁶_{Apr. 21} and Crocq, the younger, ⁸⁶⁸_{Dec. 30, 71} each reports a case of pseudoleukæmia terminating in leukæmia; but the last-named author does not on this account believe in a close relationship, explaining the occurrence rather as a coincidence.

Tissier ¹⁰⁰_{July 21} reviews the recent contributions to the subject of pseudoleukæmia, pointing out the different varieties, including the dermal, tonsillar, and intestinal, and presenting the views of different authors on the relation of pseudoleukæmia to leukæmia. He contrasts with Hodgkin's disease the infantile pseudoleukæmia of Jaksch, and shows that this has closer analogy with leukæmia than with pseudoleukæmia.

Dreschfeld, of Manchester, England, ²_{Apr. 20} contributes an interesting paper on acute Hodgkin's disease, reporting three cases and alluding to a few others. In the cases reported the onset of the disease preceded death by only a few weeks. The symptoms of onset were pain, weakness, pallor, loss of appetite, and pyrexia. In one the intra-thoracic glands, in a second the abdominal, and in the third the superficial glands were involved. There was no characteristic condition of the blood; merely an ordinary anæmia. The disease usually kills by exhaustion or complications, but recovery may occur. Referring to the histology of the glands in this, as well as the chronic form, he remarks that there is no essen-

tial difference between lymphosarcoma and lymphadenoma, but he regards both as essentially granulomatous diseases, the result of some infectious agent.

Jean Crocq, the younger, of Brussels, ⁸⁶⁸_{Dec. 27, '01} refers to the common laxity in establishing the diagnosis of pseudoleukæmia, many enlargements of lymph-glands from diverse causes being regarded as such. True Hodgkin's disease, he maintains, is a rarer malady than one would be led to suppose from the reports. He does not believe that leukæmia begins with a pseudoleukæmic stage, and points out that leucocytosis may arise in the terminal stages of pseudoleukæmia, as in tubercular and other enlargements of lymphatic glands.

Mensi, of Turin, ⁵⁸⁹_{Jan. 11} reports as *pseudoleukæmia infantile* a case of a child 16 months old, in which there was enlargement of spleen, liver, and lymph-glands, with a reduction of red corpuscles to 3,300,000, but without leucocytosis. Arning ⁸⁴_{Nov. 17} exhibited, at the Congress of the German Dermatological Association, a case of *pseudoleukæmia cutis* in the person of a young girl. There were small nodules about the face, arms, palate, and uvula, and microscopically, these showed granulation cells infiltrating the neighboring structures. The administration of arsenic was followed by marked improvement, and in the discussion of the case Kaposi, Touton, and Pick referred to the happy effect of arsenic in similar cases.

Hingston, of Montreal, ²⁸²_{Feb.} reports a case of splenectomy in a case apparently of leukæmia, though it is not definitely stated. The pedicle was short, and the operation, therefore, attended with free bleeding. The patient died in seven hours.

TRANSFUSION AND HYPODERMOCLYSIS.

Korstmann ⁶⁹_{Apr. 21}, ²_{May 21} calls attention to the danger of over-distension of the venous system by intra-venous injections and to other dangers. He prefers parenchymatous injections, using 600 cubic centimetres (20 ounces) of salt solution, which is rapidly taken up even when circulation is poor. In case of extreme circulatory weakness, a small intra-venous injection might first be used to start up the circulation. He reports 6 cases of intra-venous injection, of which but 1 recovered, and 5 of parenchymatous, in which but 1 died.

Onuf-Onufrowicz, of Dolgeville, N. Y.,⁵⁹ reports a case of excessive post-partum hæmorrhage, in which enteroclysis and hypodermoclysis were used with excellent result, and, in spite of septic infection, the woman recovered. A quart (1 litre) of saline solution, injected into the rectum immediately after the hæmorrhage, was completely absorbed. Subsequently about a pint was thrown under the skin, and the patient reacted. A second rectal injection of a quart, the next day, was necessary, but some of the fluid was discharged.

Löwenthal, of Vienna,⁸ records a case of poisoning by illuminating gas treated with intra-venous injections and later by transfusion. The patient, however, succumbed. Löwenthal prefers injection of salt water in these cases, because of the increased action of the kidneys and, therefore, increased elimination of the poison.

Richardson, of London,⁸⁸ recalls a case of cholera in which intra-venous injections of salt solution were followed by resuscitation sufficient to allow the patient to sit up and make a will. The operation was repeated six times, and it was noted that good effect could only be obtained when the venous system was rapidly distended. He further calls attention to the fact that, in collapse, the salt solution injected merely mixes with the blood and makes circulation possible. He, therefore, suggests that venous blood be added to a solution of phosphate and chloride of sodium. In methylene or chloroform collapse where no blood has been lost he suggests injection of saline solution, to which may be added ammonia or aromatic spirits of ammonia.

Pilcher, of Brooklyn,²⁰⁵ finds intra-venous injections of salt water of use in cases of shock independent of hæmorrhage. Pye-Smith, of London,⁶ reports five cases of anæmia from hæmorrhage, in which intra-venous injections of saline solution exercised marked influence. He also calls attention to the value of this treatment to establish circulation before anæsthesia and operation. Large quantities must be used, as the bulk of the blood is reduced and must be restored. A simple contrivance, consisting of a T-shaped glass tubing attached by rubber tubing to the cannula and the bottle of saline solution, furnishes a means with which, by alternate pressure of the tubing, a steady stream of fluid may be thrown into the vein without danger of admixture of air.

Ziemssen, of Munich, ³⁴ does not agree with those who regard direct transfusion of blood dangerous. He has had excellent results in six cases recently, and states that a little dexterity obviates the danger of fibrin-ferment intoxication, and that, when the latter does occur, there is only a slight fever as a result. Landois, ⁶⁹ _{Jan. 21, May 28; Apr. 28} ³⁴ suggests the use of an alcoholic extract of the heads of leeches to prevent coagulation of blood in transfusion. Ferment intoxication would thus be easily prevented. His experiments seem to support his theory.

DISEASES OF THE SPLEEN.

Carr, of London, ⁶ _{Apr. 23, 20; Feb. 12} ² reports the study of 30 cases of splenic enlargement in children from 2 months to 2½ years old. There was usually, also, some enlargement of the liver and lymph-glands. Of the 30 cases, 10 died, 13 improved, 1 remained stationary, and 6 could not be traced. Syphilis was positively determined in 14 cases, but Carr disclaims for syphilis and ague anything more than a predisposing influence, some exciting cause always being necessary in addition. The autopsies in 7 cases revealed nothing beyond the customary features seen in hypertrophies of the spleen from any cause.

Fox and Ball, of London, ² _{Apr. 20} could not, in 63 cases of splenic enlargement in children, exclude rickets in a single case; in 41 per cent. hereditary syphilis was positively determined and, doubtless, existed in others. This led them to investigate the condition of the spleen in all cases of congenital syphilis, and in 155 cases they found such hypertrophy in 48.8 per cent. The histological characters could not be distinguished from those of rachitic spleens. In a note, the authors state that Bland Sutton informs them that the spleen is often enlarged in rachitic monkeys, especially the very young.

Debove, of Paris, ³ _{Aug. 3} again calls attention to the *splenomégalie primitive*, described by himself and Brühl. The pathology of the condition remains obscure, as no post-mortem examinations have been recorded. The disease is distinguished from leukæmia by absence of leucocytosis and by a peculiar quality of the splenic tissue recognizable on palpation; from pseudoleukæmia by absence of glandular enlargement and by the slow development of the disease. Other authors, however, have described enlargement of

the lymph-glands, and therefore insist that splenomegaly is merely Hodgkin's disease of splenic type. Debove finds iron of great value in the treatment. Gaucher, of Paris,^{3, 17} insists that the splenomegaly of Debove and Brühl is the same disease as that which he described, in his thesis of 1882, as "primary epithelioma or idiopathic hypertrophy without leukæmia," and of which he then reported the pathological anatomy. He found hypertrophy of the capsule and trabeculæ, with the presence of large, epithelial-like cells in the pulp and other smaller ones in process of transformation into epithelioid cells.

Rendu, of Paris,¹⁷ reports a case of Debove's splenomegaly in a man of 37 years, in whom the disease began six years before. The man's personal history was good, and he had never had ague. The spleen grew progressively larger and the blood more and more anæmic. On the other hand, he has sometimes seen a plethoric state of the blood. He has also seen the disease terminate in leukæmia.

Bobulescu, of Bucharest,¹¹⁸ reports two cases of malarial enlargement of the spleen, in children of 4 and 5 years, respectively, in which incontinence of urine was marked, and seemed entirely due to the splenic hypertrophy.

Gaston, of Paris, and Valée, of Rouen,¹¹⁸ in an investigation of the spleen in infancy, made bacteriological studies of the aspirated fluid of the spleen in 23 cases of various diseases. In 3 instances (twice in typhoid fever and in 1 of 4 cases of pulmonary tuberculosis) the specific organism of the disease was obtained. In 4 cases several organisms co-existed, and in a great number of all staphylococci were detected.

Several interesting cases of hydatid disease of the spleen have been recorded. Martini, of Palermo,⁴⁶⁰ reports three; Grant and Snell, of London,², and Bouveret, of Lyons,²¹¹ each one. In the case of Grant and Snell a girl of 18 years presented a large tumor of the spleen. Two years later a copious gush of urine with subsidence of the tumor occurred; and ten years later, having in the meantime been well and having borne five children, the patient passed typical hydatid membrane by rectum and pus from rectum and bladder. The case of Bouveret occurred in the service of Bonnet, and was that of a woman of 40 years, who had the hydatid tumor without any urgent symptoms for thirteen years.

Guesde²⁰⁶⁹ calls attention to the fact that trauma is not rarely a cause of rupture of the spleen, especially when the latter is bound to the abdominal walls by old adhesions. In studying the structure of the spleen in old people, Pilliet⁸, Apr. 6, found the proper tissue wanting and replaced largely by infiltrated blood. This condition of the spleen he regards as the cause of the anæmia of old people.

SCURVY.

Petit, of Paris, ⁵⁵ Apr. 16, states that the disease was accurately described and the general conditions leading to its development recognized by Jean Eichtius in 1541. He advised the remedies and diet which we now recognize as antiscorbutic, and said that the occurrence of an outbreak in a garrison was a reproach to the management.

Berthenson⁸²⁸ R. 2, H. 2, 3, 4, 5; ⁴¹ Aug. 29 describes the outbreak of scurvy in the Military Hospital of St. Petersburg, in which, of 225 cases, 76 developed within the hospital, occurring in patients suffering with typhoid fever, intestinal troubles, pleurisy, and other conditions. Of the whole number, 163 recovered entirely, 52 were paroled for a year on account of anæmia, 19 died. Of the last, 3 were uncomplicated, 6 were cases associated with typhoid fever, 9 with tuberculosis, and 1 with croupous pneumonia. The author concludes, from the evident epidemicity, the apparent contagiousness, with distinct incubation in certain cases, and from the absence of second attacks, that scurvy is an infectious malady, though diet plays a part in the causation.

Northrup¹ Dec. 12, '91 reported, at the meeting of the American Pediatric Society, two cases of infantile scurvy and cited seven others recorded in American literature. He considers the disease one of great rarity; an opinion from which Jacobi dissented, claiming that many cases are overlooked from the absence of bleeding from the gums, etc. Thomson⁶ June 11 records an interesting case in a child of 7 months. Some distinct, though not marked, evidences of rickets were present, and the child suffered with anæmia, depression, and hæmaturia. Sponginess of the gums and hæmorrhages in the skin were absent. With proper diet and orange-juice, the child rapidly recovered. An interesting point also noted by Northrup in one of his cases was the greedy grasping after and sucking of oranges.

Pott, of Halle, ⁸⁴ after a review of the literature of scorbutus in infants, remarks that the disease is rare in Germany, not a single case having occurred in 22,000 patients treated at the outdoor clinic at Halle. Subperitoneal hæmorrhages played a conspicuous part in the symptomatology of two cases in his private practice, but he thinks the term "acute rickets" entirely unwarranted. The so-called antiscorbutic remedies failed entirely in his hands, but iron seemed useful.

HÆMOPHILIA.

Koenig ¹⁹ delivered a most interesting lecture on the joint-troubles in hæmophilia, or "bleeders' joints." This trouble is one beginning with hæmorrhage into a joint (bleeding joint) and terminating in inflammation, ankylosis, erosion, with deformity. He describes three stages: (1) the stage of hæmarthrosis; (2) stage of inflammation; (3) stage of retrogressive changes with deformity. The painless, sudden onset in pale young men marks the first stage. Hæmorrhages in the skin would complete the diagnosis. The second stage is strikingly similar to the white swelling of tuberculous arthritis, and Koenig has three times made a mistaken diagnosis, two of the three cases having suffered death in consequence, from hæmorrhage after operation; the third recovered. It is to prevent this fatal error that the author calls attention to the condition. As to treatment, he says it is mainly a question of what ought *not* to be done. Rest and care are the main features.

Bertrand, of Weisbaden, ²⁰⁰ in his dissertation, maintains that the danger of operations in hæmophilia has been overrated, basing his opinion on the favorable results of Czerny, Cramer, and others. Koenig, on the other hand, takes a very different view of the safety of operations.

McMahan ⁷⁷ reports the unique case of a woman, who suffered with the sudden development of superficial blood-tumors, following sharp pain, and in a few minutes rupturing with considerable force. These have been noted for eight years, and affect the skin of the hands and forearms, and also the mucous membrane of the stomach, œsophagus, mouth, and other parts. It is not explicitly stated whether he himself saw any of these attacks or not.

Delafield, of New York, ²⁰²_{Apr.11} advises large doses of fluid extract of hydrastis (20 drops) in hæmophilia; and Bernays ⁸²_{Apr.16} reports two cases in which hæmorrhage was arrested by full doses of neurosine, producing twenty and eleven hours' sleep in the two cases, respectively, and by local pressure. He urges that there is, in these cases of hæmophilia, a nervous element which requires quietants.

Watkins, of Nashville, Tenn., ¹_{Aug.13} in a case of repeated and excessive epistaxis in a man of 49 years, administered lime-water in liberal quantity, and found that the hæmorrhage ceased and remained absent until the patient neglected the use of the remedy. Watkins was led to use this treatment by the recent studies of Arthus and Pagés, and by the absence of lime in the fibrin of the patient's blood, as seen by spectroscopic examination.

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435. *Revue clinique d'oculistique, Paris.*
436. *Journal of Heredity, Chicago.*
437. *Schweizerische Blätter für Gesundheitspflege, Zurich.*
438. *Gazette française de médecine et de pharmacie, Paris.*
439. *Revue obstétricale et gynécologique, Paris.*
440. *The Microscope, Trenton, N. J.*
441. *Revista de sanidad militar, Madrid.*
442. *Gazette médicale et pharmaceutique de France.*
443. *Revue d'hygiène et de police sanitaire, Paris.*
444. *Pharmacology of the Newer Materia Medica, Detroit.*
445. *Zeitschrift für Schulgesundheitspflege, Hamburg.*
446. *Revue speciale de l'antisepsie médicale et chirurgicale, Paris.*
447. *Revue d'anthropologie, Paris.*
448. *Aerztlicher Central-Anzeiger, Hamburg.*
449. *Archives d'anatomie pathologique Charcot, Paris.*
450. *Bulletin de la Société clinique, Paris.*
451. *International Medical Magazine, Philadelphia.*
452. *Nouvelle iconographie de la Salpêtrière, Paris.*
453. *Annales de la reale Academia de ciencias medicas fisicas y naturales de la Habana.*
454. *Archives médicales belges, Bruxelles.*
455. *Bulletin de la Société de médecine de Gand.*
456. *Revista de ciencias médicas, Barcelona.*
457. *Archives de médecine expérimentale et d'anatomie pathologique, Paris.*
458. *Archivo de la Sociedad de Estudios Clinicas, Madrid.*
459. *Cronica médico-quirúrgica de la Habana.*
460. *Archivio per le scienze mediche, Torino.*
461. *Archivii italiani di laringologia, Naples.*
462. *The Post-Graduate, New York.*
463. *Annales de obstetricia ginecopatía y pediatria, Madrid.*
464. *Revista di ostetricia e ginecologia, Torino.*
465. *Der Thierarzt, Wetzlar.*
466. *Archivio di ortopedia, Milan.*
467. *Bulletin de la Société royale de pharmacie de Bruxelles.*
468. *Revista d'igiene practica e sperimentale, Naples.*
469. *Boston Journal of Health.*

470. *Annali clinici dell' Ospedale degli Incurabili in Napoli.*
471. *Bulletins de la Société de médecine pratique, Paris.*
472. *Bullettino delle scienze mediche, Bologna.*
473. *American Druggist, New York.*
474. *Cronaca del manicomio di Ancona.*
475. *Berliner Klinik, Berlin.*
476. *Health Monitor.*
477. *Annali di chimica e di farmacologia, Milan.*
478. *Bulletin du service de santé militaire, Paris.*
479. *Journal des maladies cutanées et syphilitiques, Paris.*
480. *Annali universali di medicina e chirurgia, Milan.*
481. *Boletin di medicina y farmacia, Barcelona.*
482. *Canadian Pharmaceutical Journal, Toronto.*
483. *The Climatologist, Philadelphia.*
484. *Bullettino della reale Accademia medica di Roma.*
485. *Archivio di patologia infantil, Rome.*
486. *China Imperial Maritime Customs Medical Reports, Shanghai.*
487. *Correspondenzblatt des allgemeinen mecklenburgischen Aerztereins, Rostock.*
488. *Archiv for Pharmaci og technisk Chemi, med deres Grundvidenskaber, Copenhagen.*
489. *El Dictamen, Madrid.*
490. *Atti e rendiconti della Accademia medico-chirurgica di Perugia.*
491. *Journal de micrographie, Paris.*
492. *Baltimore Medical and Surgical Record.*
493. *El observador médico, Madrid.*
494. *Gaceta médica catalana, Barcelona.*
495. *Deutsche militärärztliche Zeitschrift, Berlin.*
496. *Correspondenzblätter des allgemeinen aertztlichen Vereins von Thüringen, Leipzig.*
497. *Il Morgagni, Milan.*
498. *Finska Läkare-sällskapets handlingar, Helsingfors.*
499. *Journal of Microscopy and Natural Science, London.*
500. *Boletin de la Revista de medicina y cirugía prácticas, Madrid.*
501. *Bollettino d'oculistica, Florence.*
502. *Der Naturarzt, Dresden.*
503. *El siglo médico, Madrid.*
504. *Journal of Hydrotherapy, London.*
505. *Gazzetta degli ospitali, Naples.*
506. *Journal of the Arkansas Medical Society, Little Rock.*
507. *Giornale italiano delle malattie veneree e della pelle, Milan.*
508. *Skandinavisches Archiv für Physiologie, Leipzig.*
509. *Ejenedelnaya klinicheskaya Gazeta.*
510. *Druggists' Circular.*
511. *Blätter für Kriegsverwaltung, Berlin.*
512. *Gyógyászat, Budapest.*
513. *Il progresso medico, Naples.*
514. *Ohio Journal of Dental Science, Toledo.*
515. *Gazzetta medica di Roma.*
516. *La independencia médica, Barcelona.*
517. *Vaccination Enquirer and Health Review, London.*
518. *Bullettino della Commissione speciale d'igiene del municipio di Roma.*
519. *Journal of Materia Medica, New Lebanon, N. Y.*
520. *Gazeta lekarska, Warsaw.*
521. *Journal of Comparative Pathology and Therapeutics, Edinburgh.*
522. *Bullettino medico cremonese, Cremona.*
523. *Kinesithérapie, Paris.*
524. *La médecine contemporaine, Paris.*
525. *Zeitschrift der Tokio medicinischen Gesellschaft, Tokyo.*
526. *Giornale della reale Società italiana d'igiene, Milan.*
527. *Bulletins et mémoires de la Société de thérapeutique, Paris.*
528. *L'écho médical, Toulouse.*
529. *Bulletins et mémoires de la Société française d'ophtalmologie, Paris.*
530. *Meditzinskoje Obozrenije, Warsaw.*
531. *Giornale medico del reale esercito e della real marina, Roma.*
532. *Les nouveaux-nés, Paris.*
533. *Medical and Professional Review, London.*
534. *Gaceta de oftalmologia y de otologia, etc., Madrid.*
535. *La médecine illustrée, Paris.*
536. *Medical Reformer, Agra City, India.*

537. *Giornale internazionale delle scienze mediche*, Naples.
538. *Le Scalpel*, Liège.
539. *Bulletins de la Société anatomique de Nantes*.
540. *L'Osservatore*, Torino.
541. *Aerztliche Mittheilungen aus Baden*, Karlsruhe.
542. *La crónica médica*, Lima.
543. *Bulletin de la Société anatomo-clinique de Lille*.
544. *La correspondencia médica*, Madrid.
545. *Ciencia médico-escolástica*, Barcelona.
546. *Cincinnati Medical and Dental Journal*.
547. *Massachusetts Medical Journal*, Boston.
548. *Clinical Register*, Knoxville, Tenn.
549. *A medicina contemporanea*, Lisbon.
550. *Cronaca del manicomio di Siena*.
551. *Medycyna*, Warsaw.
552. *Clinique*, Chicago.
553. *El progreso médico-farmacéutico*, Madrid.
554. *Ottawa Medical World*.
555. *Meditzinisko Spisanié*, Budapest.
556. *National Druggist*.
557. *New Zealand Medical Journal*, Dunedin.
558. *O Brazil-medico*, Rio de Janeiro.
559. *Orvosi hetilap*, Budapest.
560. *Pharmaceutische Post*, Vienna.
561. *Quarterly Therapeutic Review*, London.
562. *Pharmaceutical Era*, Detroit.
563. *Orvosi heti szemle*, Budapest.
564. *Progrèsul médical roumain*, Bucharest.
565. *Quarterly Journal of Medical Science*, London.
566. *Revista practica de pediatria*, Madrid.
567. *Sanitary Engineering*, London.
568. *St. Joseph Medical Herald*, St. Joseph, Mo.
569. *Przeglad lekarski*, Krakow.
570. *Quarterly Compendium of Medicine*, Philadelphia.
571. *Russkaia meditzina*, St. Petersburg.
572. *Tidsskrift for praktisk medicin*, Christiania.
573. *Terapeutica medica*, Naples.
574. *El restaurador farmacéutico*, Barcelona.
575. *Pharmaceutische Centralhalle für Deutschland*, Berlin.
576. *Gesundheits-Ingenieur*, Munich.
577. *Union médicale du nord-est*, Reims.
578. *Revista médica de Chile*, Santiago, Chili.
579. *Vereinsblatt der pfaelzischen Aerzte*, Frankenthal.
580. *Revue sanitaire de la Province*, Bordeaux.
581. *Pharmaceutical Record*, London.
582. *Journal da Sociedade das sciências medicas de Lisbon*.
583. *Nederlandsch Tijdschrift voor Geneeskunde*, Amsterdam.
584. *World's Medical Review*, Philadelphia.
585. *Revue scientifique et administrative des médecins des armées de terre et de mer*, Paris.
586. *Wratsch*, St Petersburg.
587. *Répertoire de thérapeutique*, Paris.
588. *Wiadomosci lekarskie*, Lwow.
589. *Riforma medica*, Naples.
590. *Wjestnik klinitscheskoj i ssudebnoj psichiatrii i neiropatologii*, St. Petersburg.
591. *Rivista sperimentale di freniatria e di medicina legale in relazione con l'antropologia e le scienze giuridiche e sociali*, Reggio-Emilia.
592. *Zeitschrift für die Behandlung Schwachsinniger und Epileptischer*, Dresden.
593. *Kjopenhavenske medicinske selskabs förhandlingar*, Copenhagen.
594. *Revista veneta di scienze mediche*, Venice.
595. *Zeitschrift für Geburtshülfe und Frauenkrankheiten*, St. Petersburg.
596. *Rivista clinica e terapeutica*, Naples.
597. *Bulletin de la Société médicale de l'Yonne*, Auxerre.
598. *Zeitschrift für Wundärzte und Geburtshülfer*, Hegnach.
599. *L'actualité médicale des sciences médicales et des intérêts professionnels*, Paris.
600. *Mittheilungen für den Verein Schleswig-Holsteinischer Aerzte*, Kiel.
601. *Rivista clinica*. *Archivio italiano di clinica medica*, Milan.
602. *American Anthropologist*, Washington, D. C.
603. *Revue d'anthropologie*, Paris.

604. Il raccogliatore medico, Forlì.
 605. Archivio di psichiatria, scienze penali ed antropologia criminale, Torino.
 606. L'Homme, Paris.
 607. Revista especial de oftalmología, sifilografía y dermatología, Madrid.
 608. Revue internationale scientifique et populaire des falsifications des denrées alimentaires, Amsterdam.
 609. Archiv für Anatomie und Entwicklungsgeschichte, Leipzig.
 610. La medicina contemporánea. Revista médica de Reus.
 611. Medical Current, Chicago.
 612. Archivos de medicina y cirugía de los niños, Madrid.
 613. Revista Balear de ciencias médicas, Palma de Mallorca.
 614. Giornale di farmacia, di chimica e di scienze affini, Torino.
 615. La rassegna di scienze mediche, Modena.
 616. Gazzetta medica lombarda, Milan.
 617. Indian Medical Journal, Calcutta.
 618. Crónica médica de Valencia.
 619. Revista médico-farmacéutico de Aragón, Zaragoza.
 620. El monitor médico, Lima.
 621. Ejenedelnaya, St. Petersburg.
 622. P e s t e r medicinis ch - chirurgische Presse, Budapest.
 623. Der Militärarzt, Vienna.
 624. Bollettino delle malattie dell' orecchio, della gola e del naso, Florence.
 625. Gazzetta di medicina publica, Naples.
 626. Annales de la Société d'hydrologie médicale de Paris.
 627. Mittheilungen aus der Vereins der Aerzte in Steiermark, Graz.
 628. Bollettino delle cliniche, Milan.
 629. La medicina preventiva; Gazzetta mensile d'igiene clinica e terapia, Naples.
 630. Coimbra médica, Coimbra.
 631. Minnesota Medical Monthly, St. Paul.
 632. Revista de medicina y cirugía prácticas, Madrid.
 633. Revista de laringología, otología y rinología, Barcelona.
 634. Revista médica de Sevilla.
 635. Revista dos cursos practicos et theoreticos da Faculdade de medicina do Rio de Janeiro.
 636. Dnevnik obshestva vrachei pri Imperatorskom Kazanskom Universitetie, Kazan.
 637. Annali della Università libera di Perugia.
 638. Revista médica de Bogatá.
 639. Revista argentina de ciencias médicas, Buenos Ayres.
 640. Kronika lekarska, Warsaw.
 641. Annales de la Société de médecine d'Anvers.
 642. Gazeta medica da Bahia.
 643. Revue médicale, Louvain.
 644. Sems kij wratsch, Tchernigoff.
 645. Texas Sanitarian, Austin, Texas.
 646. Doctor's Weekly, New York City, N. Y.
 647. Alabama Medical and Surgical Age, Anniston.
 648. Journal des Sociétés scientifiques de la France et de l'étranger, Bordeaux.
 649. Zeitschrift der Bakterienkunde, Leipzig.
 650. Wiener medicinische Blätter, Vienna.
 651. Mittheilungen aus der medicinischer klinik zu Königsberg.
 652. Giornale di neuropatologia, Naples.
 653. La médecine russe, St. Petersburg.
 654. Revista de médico-farmacéutica, Castellón.
 655. Bollettino della Poliambulanza di Milano.
 656. Revista Brasileira de medicina, Rio de Janeiro.
 657. International Review of Medical and Surgical Technics, Palatka, Fla.
 658. Bulletin international des Sociétés de secours aux militaires blessés, Genève.
 659. Vóz de Hipocrates, Mexico.
 660. Spitalul, Bucharest.
 661. Annales da Academia de medicina do Rio de Janeiro.
 662. Revista médico quirúrgica, Buenos Ayres.
 663. Medical Mirror, St. Louis.
 664. Moniteur du praticien, Paris.
 665. El progreso ginecología y pediatria, Valencia.
 666. Revista de medicina cirugía y farmacia, Barcelona.
 667. Journal de pharmacie e chimica, Lisbon.

668. Medical Visitor, Chicago.
 669. Memorie della reale Accademia medica di Genova.
 670. Mémoires de la Société de médecine de Nancy.
 671. Revue médicale de Moscou.
 672. Der Fortschritt, Geneva.
 673. Satellite of the Annual, Philadelphia.
 674. Le mouvement hygiénique, Brussels.
 675. Mittheilungen aus der anthropologischen Gesellschaft in Wien.
 676. Osaka Medical Journal, Japan.
 677. Japanese and Foreign Medical News, Tokyo.
 678. Eira, Stockholm.
 679. Centralblatt für Kinderheilkunde, Leipzig.
 680. Revue Inter. de Rhinol., d'Otol., de Laryngol. et d'Ophthal., Paris.
 681. Mittheilungen aus der medicinischen Facultät der kaiserlich-Japanischen Universität, Tokyo.
 682. Entomologisk Tidskrift, Stockholm.
 683. Novosti Terapij, Budapest.
 684. Annales de la Société de médecine de Gand.
 685. Bulletin de la Société de médecine mentale de Belgique, Gand.
 686. Archivio italiano per le malattie nervose e più particolarmente per le alienazioni mentali, Milan.
 687. Journal of the Army Medical Society, Japan.
 688. Psychiatrische Bladen, Amsterdam.
 689. Reports of the Psychical Research Society, London.
 690. Bulletin de la Société de psychologie physiologique, Paris.
 691. Revue illustrée de polytechnique médicale, Paris.
 692. The Hospital, London.
 693. Revue de la masso-électrothérapie, Paris.
 694. Public Health, London.
 695. Hospital Gazette, London.
 696. Chirurgisches westnik, St. Petersburg.
 697. British Journal of Dermatology, London.
 698. Chemiker Zeitung, Berlin.
 699. Revista clinica de Barcelona.
 700. Revue mycologique, Paris.
 701. Zoologischer Anzeiger, Leipzig.
 702. Kozégeszségügy és törvényszéki orvostoi, Budapest.
703. Westnik obschtschestvennoj gigieny, ssudebnoj i praktitscheskoj medizini, Moscow.
 704. Westnik oftalmologii, St. Petersburg.
 705. Journal ophthalmologique du Nord, Lille.
 706. Bulletin de statistique démographique et médicale de Bruxelles.
 707. Journal de pharmacie d'Anvers.
 708. Bulletin de la Société anatomopathologique de Bruxelles.
 709. Bulletin de la Société belge de microscopie, Bruxelles.
 710. Bulletin de la Société royale de médecine publique de Belgique, Bruxelles.
 711. American Journal of Dental Science, Baltimore.
 712. Bulletins et publications de la Société de médecine du Luxembourg.
 713. Bulletin de la Société de médecine de Reims.
 714. Archivio Bizzozero, Naples.
 715. Bulletin de la Société de médecine du département de la Sarthe.
 716. Los Avisos, Madrid.
 717. Bulletins et publications de l'Académie des Sciences de Belgique, Brussels.
 718. Bulletin de l'Institut de Statistique, Paris.
 719. Western Druggist, St. Louis.
 720. Revue internationale de l'électrothérapie, Paris.
 721. Dental Headlight, Nashville.
 722. Jahresbericht über die Fortschritte der Geburtshülfe und Gynäkologie, Leipzig.
 723. The Medical Pioneer, Enfield, England.
 724. Gynäkologisches Centralblatt, Berlin.
 725. Moniteur d'ophtalmologie, St. Petersburg.
 726. Vestnik oftalmologii, St. Petersburg.
 727. Annali dell'Istituto d'igiene sperimentale dell'Università di Roma.
 728. Répertoire universel d'obstétrique et de gynécologie, Paris.
 729. Transcaucasian Lying-in Hospital Reports.
 730. Bollettino scientifico, Pavia.
 731. Wiener medicinisches Jahrbuch, Vienna.

732. *Rivista clinica dell' Università di Napoli.*
733. *Annales de médecine thermique, Paris.*
734. *Australian Journal of Pharmacy, Melbourne.*
735. *La médecine hypodermique, Scéaux.*
736. *Il Sordomuto, Naples.*
737. *L'Anomalo. Gazzettino antropologico psichiatrico, medico-legale, Naples.*
738. *Centralblatt für orthopädische Chirurgie und Mechanik, Berlin.*
739. *Giornale della reale Accademia di medicina, Torino.*
740. *Archiv für Wissenschaften und praktische Thierheilkunde, Leipzig.*
741. *Ephemeris, Brooklyn.*
742. *Apotheker-Zeitung, Berlin.*
743. *Het Maandblad voor Apothekers., Amsterdam.*
744. *Pharmaceutical Journal and Transactions, London.*
745. *Zubovratchebnyi Vestnik, St. Petersburg.*
746. *Bulletins des travaux de la Société de pharmacie de Bordeaux.*
747. *L'Union pharmaceutique, Paris.*
748. *Fortschritte der Krankenpflege, Bern.*
749. *Bulletin de la Société d'anthropologie de Paris.*
750. *Giornale fiorentina d'igiene, Florence.*
751. *Bulletin de la Société de biologie, Paris.*
752. *The American Doctor, Richmond, Virginia.*
753. *Deutsche Zeitschrift für praktische Medizin, Berlin.*
754. *Wojenno Ssanitasnoje, St. Petersburg.*
755. *Archives générales d'hydrologie, de climatologie et de balnéothérapie, Paris.*
756. *Fort Wayne Journal of Medical Science.*
757. *Giornale di clinica, terapia e medicina pubblica, Naples.*
758. *Časopis lékařů českých, Praze.*
759. *American Journal of Chemistry.*
760. *Times and Register, Philadelphia.*
761. *Beiträge zur klinischen Chirurgie, Tübingen.*
762. *Archivio italiano di pediatria, Naples.*
763. *Archives de Sociologie, Paris.*
764. *Johns Hopkins Hospital Bulletin, Baltimore.*
765. *La salute pubblica, Perugia.*
766. *Studies in Clinical Medicine, Edinburgh.*
767. *La Medicina practica, Madrid.*
768. *Beiträge zur pathologischen Anatomie und zur allgemeinen Pathologie, Jena.*
769. *Dominion Dental Journal, Toronto.*
770. *Meditzinskoie Pregléd, Budapest.*
771. *Hot Springs Medical Journal, Hot Springs, Ark.*
772. *La Sicilia medica, Palermo.*
773. *Revista de ciencias médicas, Havana.*
774. *Boletin de medicina y cirugía, Madrid.*
775. *Mittheilungen der naturforschenden Gesellschaft in Bern.*
776. *Journal of Ophthalmology, Otolology, and Laryngology, New York.*
777. *Szemézet, Budapest.*
778. *Nordisk ophthalmologisk Tijdskrift, Copenhagen.*
779. *North American Practitioner, Chicago.*
780. *Annales de la Polyclinique de Bordeaux.*
781. *L'odontologie, Paris.*
782. *Journal d'électricité médicale, Paris.*
783. *Nowiny lekarske, Posen.*
784. *Revista médica de México.*
785. *El tula médica de Valladolid.*
786. *St. Louis Clinique.*
787. *Lehigh Valley Medical Magazine, Easton, Pa.*
788. *Il progreso de gynecologia y pediatria, Madrid.*
789. *Le progrès dentaire, Paris.*
790. *Nederlandsch Tijdschrift voor Verloskunde en Gynæcologie, Haarlem.*
791. *Γαληνός' Δόγμα.*
792. *El Estudio, Mexico.*
793. *Journal of the Quekett Microscopical Club, London.*
794. *Memorie della reale Accademia delle scienze dell' Istituto di Bologna.*
795. *La cellule, Brussels.*
796. *Archives de zoologie expérimentale et générale, Paris.*
797. *Alger médical, Algiers.*
798. *Revue mensuelle des maladies des yeux, Paris.*
799. *Zeitschrift für Ethnologie, Berlin.*

800. *Medižinskija pribawlenija k morskomu sborniku*, Moscow.
801. *Kansas Medical Journal*, Topeka.
802. *Lo spallansani*, Rome.
803. *Internationale Monatschrift für Anatomie und Physiologie*, Leipzig.
804. *Monatsschrift des Vereins deutscher Zahnkünstler*, Leipzig.
805. *Dental Cosmos*, Philadelphia.
806. *Archives of Surgery*, London.
807. *Journal für Zahnheilkunde*, Berlin.
808. *International Dental Journal*, Philadelphia.
809. *Zeitschrift für angewandte Chemie*, Berlin.
810. *Quarterly Journal of Microscopical Science*, London.
811. *Toledo Medical and Surgical Reporter*, Toledo, Ohio.
812. *Biologiska föreningens förhandlingar*, Stockholm.
813. *Mississippi Medical Monthly*, Meridian.
814. *Merck's Bulletin*, New York.
815. *Sanitary World*, London.
816. *Bollettino della Società fiorentina d'igiene*, Florence.
817. *Canada Health Journal*, Ottawa.
818. *Journal of British and Foreign Health Resorts*, London.
819. *La terapia moderna*, Rome.
820. *La medicina popular*, Barcelona.
821. *Revista médico-quirurgica*, Cadiz.
822. *Southern Dental Journal*, Atlanta.
823. *Archivio della riforma medica*, Naples.
824. *Journal des maladies cutanées et syphilitiques*, Paris.
825. *Annales des sciences psychiques*, Paris.
826. *Notes on New Remedies*, New York.
827. *Le mercredi médical*, Paris.
828. *Untersuchungen aus dem physiologischen Institut der Universität*, Halle.
829. *Pharmaceutical Journal of New South Wales*.
830. *Revista internazionale d'igiene*, Naples.
831. *Revista de higiene y policia sanitaria*, Barcelona.
832. *Sborník lékařský*, Praz. *Archives bohêmes de médecine*.
833. *L'anthropologie*, Paris.
834. *La psichiatria*, Naples.
835. *Revista de medicina dosimetrica*, Madrid.
836. *Annalen der Physik und Chemie*, Leipzig.
837. *Zeitschrift für Nahrungsmittel-Untersuchungen und Hygiene*, Vienna.
838. *Duodecim*, Helsinki.
839. *Bollettino della Società Lancisiana*, Rome.
840. *Bulletin de la Société impériale des naturalistes*, Moscow.
841. *British Journal of Dental Science*, London.
842. *Journal of the British Dental Association*, London.
843. *Journal de médecine pratique*, Paris.
844. *Oesterr-ungar. Centralblatt für die medicinischen Wissenschaften*, Vienna.
845. *Medical Magazine*, Lahore, India.
846. *Harper Hospital Bulletin*, Detroit.
847. *Der oesterreichische Sanitäts-Beamte*, Vienna and Berlin.
848. *Mémoires couronnés et autres mémoires publiés par l'Académie royale de médecine de Belgique*, Bruxelles.
849. *Memphis Journal of the Medical Sciences*.
850. *Northwestern Medical Journal*, Minneapolis.
851. *Wojenno meditsinskij shurnal*.
852. *Laitopisj chirurgitscheskago obschtschestwa*, Moscow.
853. *Revue d'orthopédie*, Paris.
854. *Centralblatt für allgemeine Pathologie und pathologische Anatomie*, Jena.
855. *Bacteriological World*, Battle Creek, Mich.
856. *Western Medical and Surgical Reporter*, St. Joseph, Mo.
857. *Annales de la Asistencia Publica*, Buenos Ayres.
858. *Johns Hopkins Hospital Reports*, Baltimore.
859. *Bolnitchnaja gazeta Botkina*.
860. *Revue générale des sciences pures et appliquées*, Paris.
861. *Oesterreichische aerztliche Vereinszeitung*, Vienna.
862. *Bulletin médical de l'Algérie*.
863. *Der Kinder-Arzt*, Berlin.
864. *American Medical Journal*, St. Louis.

865. Bulletin de la Société française de dermatol. et de syphiligraphie, Paris.
866. Review of Insanity and Nervous Disease, Wauwatosa, Wis.
867. Kowalewskij's Archiv.
868. Journal de médecine, de chirurgie, et de pharmacologie, Bruxelles.
869. American Chemical Journal, Baltimore.
870. Balneologisches Centralblatt, Leipzig.
871. El criterio médico, Madrid.
872. Farmacia moderna, Madrid.
873. Il faro médico, Milan.
874. Gazette des Hôpitaux de Toulouse.
875. Helsovännan. Tidskrift för allmän och enskild helsovård, Göteborg.
876. L'idrologia e la climatologia medica, Florence.
877. Klinicheskij sbornik gospiitalnoi terapevticheskij kliniki imperatorskago Varschavskago Universiteta. Nabloudeniija i izsledovanija, Warsaw.
878. New England Med. Gazette, Boston.
879. Revue d'hygiène thérapeutique, Paris.
880. Zeitschrift für analytische Chemie, Wiesbaden.
881. Zeitschrift für Fleisch- und Milchhygiene, Berlin.
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